Confidential.

5C13

QR. MR. GENERAL'S DEPT. IN INDIA. INTELLIGENCE BRANCH.
LIBRARY HEADING B
LIBRARY No. 43547
SECTION No. I
No. OF VOLS. 3

THE
TURKISTÁN

BEING A

MILITARY STATISTIC

OF THE

TURKISTÁN MILITARY DIS

OR

RUSSIAN-TURKISTÁN GAZETTEER.

COMPILED BY
COLONEL L. F. KOSTENKO,
OF THE ÉTAT-MAJOR.

Translated in the Intelligence Branch of the Quarter Master General's Department in India.

Three Volumes, with Appendices.

ST. PETERSBURG.
1880.

VOL. III.

CALCUTTA:
PRINTED BY THE SUPERINTENDENT OF GOVERNMENT PRINTING, INDIA.
1884.

THE

TURKISTÁN REGION;

BEING A

MILITARY STATISTICAL REVIEW

OF THE

TURKISTÁN MILITARY DISTRICT OF RUSSIA;

OR

RUSSIAN-TURKISTÁN GAZETTEER.

COMPILED BY

COLONEL L. F. KOSTENKO,

OF THE ÉTAT-MAJOR.

Translated in the Intelligence Branch of the Quarter Master General's Department in India.

Three Volumes, with Appendices.

ST. PETERSBURG.
1880.

VOL. III.

B
43
1
3
DATE 7.3.92
15 JUL 91
INTELLIGENCE DIVISION 15 JUL 1890

CALCUTTA:
PRINTED BY THE SUPERINTENDENT OF GOVERNMENT PRINTING, INDIA.
1884.

INTRODUCTION.

Major F. C. H. Clarke, C.M.G., R.A., in his abridged translation[1] of Colonel L. Th. Kostenko's work on Turkistán, thus writes :—

"This is certainly the most complete and comprehensive work on Russian Turkistán which has appeared in Russian or any other language.

"In its compilation Colonel Kostenko has consulted the writings and memoirs of numerous geographers and explorers, and the material so culled, together with the results of his own travels, which may be said to cover the greater part of Russian Turkistán, even beyond to the Pámir, have been collected into a valuable treatise on the geography, topography, and products of the country, while a chapter is devoted to the Russian troops, and their mode of conducting war, which cannot fail to have an interest for those desiring an insight into the nature of a force as a rule little known beyond the precincts within which it is employed.

"Readers must expect to find that part which is descriptive of the virtue of the Russian Turkistán soldier somewhat roseate in its colouring, and be prepared for statements with regard to the soldiers' invincibility, which are hardly borne out by the events of the last three campaigns against the Turkománs; but, with due allowance for the bias of patriotism, and for the muzzling of every Russian writer by the restrictions of the Press Censorship, we have, on the whole, a book which is a valuable contribution to the literature of Central Asia.

"The chapter on the Russian troops in Turkistán alone forms the subject of this abridged translation. The modes of marching and bivouacking which the Russians adopt when within striking distance of the enemy are worthy of study, and appear well suited to the comparatively small forces with which the Russians conduct their operations against an enemy far superior in point of numbers. It must be remembered, however, that the foes with which they have had to deal in the steppes of Central Asia consist chiefly of horsemen and matchlock-men. We very much doubt if the "Wagon-barricade" employed by the Russians would be of any use against an enemy provided with well-served artillery; but against a force not so provided the arrangement is methodical and perfectly sound in principle, and may, therefore, find application in our own border wars.

---

[1] *Vide* pages 898-921, Journal of the R. U. S. I., Vol. XXIV of 1880.

"The remarks at the end of the chapter on the political situation in Central Asia are also worthy of study, inasmuch as it must be remembered that it is the class of soldier-politicians to which Colonel Kostenko belongs which really carves out the destinies of the Russian empire in the Far East. His observations emphasise the importance to Russia of her frontiers being advanced until they become conterminous with Persia and Afghánistán, and hence throw light on the true object of the present campaign against the Turkománs, *viz.*, the annexation of their country, inclusive of Merve."

TABLE OF CONTENTS.

Note by Major (now Lieutenant-Colonel) F. C. H. Clarke, R.A., C.M.G., &c., recorded in his abridged translation of this volume (*vide* pages 898-921 Journal of the Royal United Service Institution, Vol. XXIV of 1880.)

SECTION V.

PRODUCTIVE CAPACITY OF TURKISTÁN.

(Information referring to Supplies and the maintenance of the Troops.)

CHAPTER I.

AGRICULTURE.

(Provisions and forage for the Troops.)

PAGES.

Classification of land as fit and unfit for wheat cultivation—System of working the soil which obtains among the natives of Turkistán—Irrigation canals (*ariks*)—Principal agricultural *oases*—Fargána, Zarafshán, Kuráma, &c.—Spare lands fit for tillage—System of land-tenure amongst the natives—Cleansing of the irrigation canals—Construction of water-lifts—System of rural economy adopted in Central Asia—Agricultural implements: plough, harrow, &c.—Field and garden produce of Turkistán—Grinding of wheat in Turkistán—Construction of mills: wheat flour and its adulteration; biscuits, sun-dried, and others. 1—20.

CHAPTER II.

COTTON CULTIVATION.

Importance of the cotton industry of Central Asia—Culture of the cotton plant—Harvesting of the cotton crops—Prices of the pods—Methods for removing the filament from the pods —*Chigrikh* apparatus—Clearing the filaments of husks—Prices of cotton wadding at the various points of Turkistán—Quality of Turkistán cotton-spinning—Preparation of webs—*Biáz* (*máta*), *buján*, *susa* or *alátcha*, *Sansam*, *Kalyám*, *tampai*, *chit* (chintz or printed stuff)—Wearing apparel of cotton stuffs—Central Asian cotton trade with Russia—Defects of Central Asian cotton—Measures adopted, or under consideration, for the improvement of Central Asian cotton—Attempts at improving the culture of cotton throughout Turkistán—Necessity of importing cotton gins—Cotton pressing—Formation of a Russian company for the study and extension of the cotton industry of Turkistán—Issue to the Turkistán troops of articles of local manufacture—Prices of the webs thus distributed—Yearly issues to the troops. 20—33.

PAGES.

CHAPTER III.

Sericulture in the Turkistán District—Origin and development of sericulture in Central Asia—Yearly amount of silk produced by the natives in Central Asia generally, and in the Turkistán District in particular—Cultivation of the mulberry-tree—Different kinds of mulberry cultivated by the natives—Diseases peculiar to the Central Asian mulberry—Methods of rearing the silk-worms—Different kinds of silk-worms—Eggs and their prices—Periods of breeding silk-worms—Winding the cocoons—Fecundity of the moths—Different diseases to which the silk-worm is subject in Central Asia—Prohibition against the export of eggs from Central Asia—Drying the cocoons—Price of the cocoons—Silk spinning in Central Asia—Defects in the native method of spinning silk—Transfer of the silk from the large to the small bobbin—Manufacture of the yarn—Different kinds of silk in Central Asia, and their relative value—Working pay—Attempt of Russian traders to study and extend sericulture in Turkistán—Russian system of silk-spinning—Causes of the failure experienced by Russian silk-spinners—Efforts of the administration to improve local silk—School of sericulture established at Táshkand—Importance of CentralAsian sericulture in respect of Russian State economy. 34—48.

CHAPTER IV.

WOOLLEN INDUSTRY.

Wool industry, and its importance to the people—Quality of the wool—Sheep, goat, and camel shearing—Prices of the wool—Spinning and dyeing of the yarn—Felt-making—Different kinds of felts (*koshmás*) and their prices—Supply of felts to the Turkistán troops—Question as to the preservation of woollen articles in the Commissariat stores—Manufacture of carpets and *paillasses*—Manufacture of camlets—Adaptation of this article by the troops—Felt hats, *káps, korjúns, lassos, nets.* 48—54.

CHAPTER V.

LEATHER INDUSTRY.

Preparation of furs by the natives, of *Yuft,* of calf leather, of goat and sheep's leather—Dyeing of the leather in various colours—Issue to the Russian troops of Turkistán of goat or sheep-skin trowsers—Manufacture of *Guzárs* and of *Sauras*—State of the leather trade in Turkistán—Defects of native leathern goods—Question as to the establishment of tanneries in Turkistán. 54—59.

CHAPTER VI.

CATTLE-BREEDING.

Wide development of cattle-breeding throughout Central Asia generally—Number of head of cattle in Turkistán—Impediments to the successful extension of cattle-rearing in Turkistán—Sheep-breeding—Kinds of sheep in Central Asia—Lambs—Products obtained from sheep—The various diseases that prevail among sheep—Impediments to the extension of sheep-rearing—Price of sheep—Breeding of horned cattle in Turkistán—Horned cattle in the Kuljan region—Price of horned cattle—Goats. 59—66.

CHAPTER VII.

SPORT.

(Fishing, hunting of wild beasts and birds, and sport of every kind.)

PAGES.

Russian company established in 1847 for fish-catching in the Aral—Impediments to the development of fish-catching in Turkistán—Fish-catching by the natives—Fishing settlements at the mouth of the Sir-Daria—Prices of fish at Kázalinsk and at Táshkand—Fisheries of the province of Semiraitchensk—Mr. Vanushin's fishing company on the Amu-Daria—Hunting of wild beasts—Sport after tigers, bears, lynxes, wolves, &c., &c., &c.—*Marál* hunting—Horns of the *Marál*—Yearly quantity of wild beasts caught in the neighbourhood of Lake Issik-Kul—Methods of hunting practised by the natives in the case of both beasts and birds—Hawking—Prices of furs of various kinds at Táshkand. 67—72.

CHAPTER VIII.

STUDS.

(Horse-breeding in Central Asia.)

Importance of horse-breeding to the natives of Central Asia—Breeds of horses—*Argamak*—the Uzbak breed—*Kárabairs*—the Kokhandi and Kirghiz breeds—Detailed description of the Kirghiz horse—Its training—The *Baránta*—Endurance of Kirghiz horses—Diseases most common amongst them—Importance to Russia of Kirghiz horse-breeding—Fitness of Kirghiz horses for Russian cavalry remounts—Establishment of a stud near Táshkand—Object of this stud—Prices for horses at various points of Turkistán. 73—90.

CHAPTER IX.

TRANSPORT.

(Camels and their importance in a military-economic sense.)

Importance of camels to the natives and to the Russian troops—Investigation of the methods of obtaining them for military purposes during a campaign—Question as to a permanent camel train kept up for army purposes—Lieutenant-General Ivanin's opinion on this subject—Permanent camel train with the French Army in Algeria—Impossibility of maintaining a permanent system of transport with the Russian forces in Turkistán—Various methods for the supply of camels for the Russian troops during steppe campaigns, and the rates chargeable for such—Breed of camels in Turkistán—Camel breeding amongst the natives—Descriptions of camels—Diseases of camels and their treatment—Camel's flesh and milk—Prices of camels. 91—98.

CHAPTER X.

FORESTRY.

(General glance at the forest wealth of Turkistán, and state of forest conservancy.)

Distribution of forests over Turkistán—Various kinds of wild trees indigenous to the soil of Turkistán—The fir, poplar, birch, &c.—Investigation of the mountain forests of the province of Semiraitchensk—Measures adopted by the local administration for the conservancy of these forests—Question as to the artificial development of forests throughout Turkistán—Establishment of a nursery garden in the province of Fargána—Timber trade—Detailed account of the floating down of mountain timber on the Zarafshán river as far as Sámarkand 98—112.

PAGES.

and Bukhára—Floating down of timber on the Sir from Namangán to and below Khojand—Floating down of timber on the Ili from Kulja to the Ili (Russian) Settlement—Price of timber at Tashkand, Sámarkand, and in the forts on the Sir-Daria—Fuel available at the various points of the Turkistan Military Circle—*Saksaul*—Description of this vegetable growth – *Saksaul* fuel and its prices—*Kolutchka*—Prices of firewood at Táshkand—Coal as an article of fuel for the troops—Dried cowdung—Prices of fuel at Vairnoye—Prices of fuel in the Kuljan region. 98—112.

CHAPTER XI.

SALT.

(Rock-Salt and that obtained by evaporation.)

Salt-mines in the valleys of the rivers Kotch-Kur and Nauroz—Salt-mines near the village of Samgár—Salt-mines in the mountains of Hissár (this salt is known by the name of *Básh-Khurd* salt)—Salt deposits (*a*) on the shores of Lake Borogo-Basun; (*b*) at the hamlet of Kámish-Kurgán; (*c*) in the neighbourhood of Lake Ebi-Nor—Unfavourable conditions under which the salt-trade of the Turkistan Circle lies. 113—116.

CHAPTER XII.

SULPHUR.

Description of the sulphur-beds at Gogut-Kok-Sai in the Province of Fargána—Examination of the question as to whether or not it would be advantageous to sink a shaft for the excavation of sulphur with a view to its export to Russia and to Europe—Sulphur beds in the Kon-Tág Mountains, in the Zarafshán Circle. 117—118.

CHAPTER XIII.

NAPHTHA SPRINGS.

Wealth of naphtha springs in the newly incorporated Province of Fargána—First attempts of Russian traders to obtain naphtha and asphalt—Character of the naphtha springs situated in the Province of Fargána—Method of obtaining naphtha in vogue amongst the natives—Chemical analysis of Fargána naphtha—Hope as to the developement of the naphtha trade throughout Turkistán. 118—121.

CHAPTER XIV.

MINING INDUSTRY.

General glance at the mining industry of Turkistán—Coal trade—Coal mines (*a*) in the Province of the Sir-Daria, (*b*) in the Kuljan region, (*c*) in the Province of Semiraitchensk, (*d*) in the Province of Fargána—Lead mining—Auriferous sands—Failures experienced by Russian traders in their search for gold in Turkistán—Search for gold by the natives—Iron, copper, and other mines. 121—129.

CHAPTER XV.

METALLURGY.

Export of metals from Russia to Central Asia—Smelting of Russian cast-iron by the natives—Local iron foundries and workshops—Manufac- 129—136.

PAGES.

ture of sword blades and *kinjáls*—Manufacture of fire-arms by the natives—Manufacture of copper articles—Gun-foundries—Silver and gold articles—Native gold, silver, and copper money—Chinese *yámbas* —Return of the prices obtaining in the town of Táshkand for various metal-wares.

CHAPTER XVI.

BUILDING MATERIAL IN TURKISTÁN.

Characteristics of the building trade in the Turkistán Circle—Quality of building materials—The poplar, fir, *Káragátch*, *Chinár* or plane, Mulberry and Willow, Wild Olive, and others—Coefficient of resistance of the wood of the various kinds of Turkistán trees—Reeds—Straw—Potters' clay—Sun-dried bricks—Kiln-baked bricks—Gypsum—Lime —Sand—Asphalt. 136—146.

SECTION VI.

THE TURKISTÁN ARMY.

Introduction. 147—149.

CHAPTER I.

TURKISTÁN TROOPS.

(Dislocation of the Troops of the Turkistán Military Circle.)

Distribution of the troops in the Circle—Average strength and composition—Outer line of forts—Securing of the Russian Frontier: (1) with Khiva, (2) with Bukhára, (3) with China—Kuljan region—Inner line of forts—Uniform plan of the fortified posts of Turkistán—Character of the barrack accommodation in Turkistán. 149—160.

CHAPTER II.

ARMAMENT OF THE TURKISTÁN TROOPS.

Armament of the Infantry, Artillery, and Cossacks—Armament of the Forts—Supply of *matériel* and of lead—Laboratory and Arsenal of Turkistán—Parks—State of the artillery *matériel*. 160—162.

CHAPTER III.

SUPPLIES OF CLOTHING, PROVISIONS, AND FORAGE.

Clothing of the Turkistán soldier, and periods for which it is required to last —Cossack uniform—Issue to the Turkistán soldier of intrenching tools —Issue of flour and of biscuits—Forage, barley, *jugára*, lucerne grass —Green corn for the horses. 162—165.

CHAPTER IV.

SANITARY CONDITIONS OF THE LIFE OF THE TURKISTÁN TROOPS.

Return of sickness amongst the troops for the ten years between 1867 and 1876—Men invalided—Influence of particular localities on the sickness and mortality amongst the troops (Jizák, Chináz, Tokmak)—Tables of sickness and mortality, according to branch of the service, physical development, period of the year, nature of disease—Epidemics amongst the troops—Intermittent fevers and Typhus—Cholera—Tables of sickness and mortality grouped according to diseases—Measures adopted for the preservation of the health of the troops since Turkistán was first occupied by the Russians. 165—182.

CHAPTER V.

INTELLECTUAL AND MORAL DEVELOPMENT OF THE TURKISTÁN TROOPS.

PAGES.

Causes that unfavourably influence the intellectual and moral development of the Turkistán soldier—Measures adopted for raising that standard—Corps of officers: training of officers—Libraries—Courts of honour—Education amongst the Turkistán troops—Morals of the lower ranks—Effect of taverns—Discipline—Number of men punished—Number of deserters and causes of desertion—Spirit of the Turkistán soldier. 182—187.

CHAPTER VI.

SERVICE AND OCCUPATION OF THE TURKISTÁN TROOPS.

Sentry duty—Escorts—Imperial and Government works—Voluntary labour—Movement of troops, (*a*) in relief, (*b*) marching of detachments, (*c*) change of quarters, (*d*) movements under canvas. 188—190

CHAPTER VII.

MILITARY MANŒUVRES.

Conditions for the development of the military training of the Turkistán troops: drill, target practice, gymnastics, fencing—Instructional Companies. 190—191.

CHAPTER VIII.

CAMPAIGNING OF THE TURKISTÁN TROOPS (WITH SKETCHES).

Peculiarities of warfare in Central Asia—Order of march—Sketch of normal order of march—Changes which would have to be made in it according to circumstances—Size of marching front and periods of march—Distribution at halting-places—Waggon barricades—Bivouacs—Sketch of normal bivouacking order and changes which would have to be made in it according to circumstances—Defence of transport, &c. 192—196.

CHAPTER IX.

FIGHTING.

Character of fighting with a Central Asian enemy—*Rôle* of infantry, artillery, and cavalry—Examples of the most brilliant Russian successes in Central Asian wars—Examples of failures—Storming of fortified points—Tables of the losses suffered by the Russians in gaining possession of Central Asian forts, and in the open field. 197—201.

CONCLUSION.

General glance at the Turkistán Circle—Its position and importance in a military and political sense—Political importance of neighbouring Asiatic States. 201—209.

APPENDIX I.

Alphabetical List of some of the places and points in Turkistán, the altitude of which has been barometrically determined, and of which the latitude and longitude have been ascertained either astronomically or trigonometrically. 212—259.

PAGES.

APPENDIX II.

Alphabetical Index to the Routes included in Kostenko's Turkistán, Vol. II, English Edition, prepared by Major W. E. Gowan, Bengal Infantry, attached to Intelligence Branch, Quartermaster General's Department in India. 260—268.

APPENDIX III.

Chronological Table relating to important events and personages in the History of Central Asia and of India. 269—286.

THE TURKISTÁN REGION.

SECTION V.

PRODUCTIVE CAPACITY OF TURKISTÁN.

(Information referring to Supplies and the maintenance of the Troops.)

CHAPTER I.

AGRICULTURE.

(Provisions and forage for the Troops.)

Classification of land as fit and unfit for wheat cultivation—System of working the soil which obtains among the natives of Turkistán—Irrigation canals (*ariks*)—Principal agricultural *oases*—Fargána, Zarafshán, Kuráma, &c.—Spare lands fit for tillage—System of land-tenure amongst the natives—Cleansing of the irrigation canals—Construction of water lifts—System of rural economy adopted in Central Asia—Agricultural implements: plough, harrow, &c.—Field and garden produce of Turkistán—Grinding of wheat in Turkistán—Construction of mills: wheat flour and its adulteration; biscuits, sun-dried, and others.

IT has been already said in the general survey of the surface of Turkistán that the amount of land fit for cultivation and settlement is small, and is confined to a strip between the wide zone of sand on the one side, and the rocky mountain range on the other, and that the width of this strip is very inconsiderable. Out of the hundred millions of *desyatínas*[1] which approximately comprise the Turkistán circle, the land fit for wheat cultivation is computed at a little more than 2 million *desyatínas*, or only a fiftieth portion of the whole extent. About 41 million *desyatínas* are available as pasture grounds for the nomads, and the remainder comprises the larger half of the territory, or about 54 million *desyatínas*. These are composed either of an extent entirely unfit both for cultivation and for pasturage, or of such desert lands as afford food for the herds for a short period only of the spring migrations.

These general relations are given in fuller detail in the following table, which is either based on elicited information or determined by personal observation:—

PROVINCE.	Total amount of land.	Under cultivation.	Nomad pasture land.	Sterile tracts.	PERCENTAGE ON 100 *DESYATÍNAS.*		
					Cultivated.	Pasture.	Sterile.
Semirechia	37,000,000	820,650	18,000,000	18,180,000	2·22	49·14	49·64
Sir-Daria	43,000,000	368,000	18,000,000	24,642,000	0·83	41·86	57·31
Fargána	6,700,000	600,000	3,000,000	3,100,000	8·96	44·78	46·26
Zarafshán	2,400,000	191,600	1,300,000	1,108,400	7·98	54·17	37·85
Amu-Daria	8,600,000	45,700	1,300,000	7,254,300	0·53	15·12	84·35
TOTAL .	97,700,000	2,015,950	41,600,000	54,284,700	2·06	43·30	54·64

---

[1] A *desyatína* is a land measure, equal to 2·86 acres.—*Trans.*

From this table it appears that cultivation is found, relatively speaking, under the most favourable conditions,—first, in the Fargána province, and then in that of Zarafshán, that is, where colonization has been most firmly established and for the longest period, and where, besides, the cultivated portion occupies approximately about one-twelfth of the territory. The least cultivated portion is the Amu-Daria province, in which agriculture is confined to a narrow strip along the Russian bank of the river that adjoins on the north the vast and barren Kizil-Kum desert. Here the colonized portion occupies not more than a two-hundredth part of the whole surface of the section. Of the 820,000 *desyatínas* shown as settled in the Semirechia province, not more than 300,000 are under cultivation. The remainder, although allotted for the use of the population of the district, consists of hay and pasture land, so that the precise proportion of arable land in this district is expressed by the proportion 0·81 per cent. We have no data wherewith to ascertain the rate at which cultivation is increasing in the district; nevertheless such an increase is observable. Certain localities in this respect offer more, and some less favourable conditions. The more favourable conditions are met with where abundance of water permits of the occupation of husbandry.

Agriculture in Turkistán, as indeed generally throughout Central Asia, is carried on principally by means of *ariks*, or canals in connection with the rivers. All such land is called *àbi*, and in the Zarafshán province *tar*. There is but a comparatively small portion of the country which is not watered artificially. Where this is the case, the elevation of the ground prevents the diversion of an *arik* from any particular river, and hence a distinction has to be made between such land and land that is irrigated by *ariks*, owing to the latter being sufficient for the supply of the population. The unirrigated land is called *liyáli*, and in the Zarafshán province *buhári*, *i.e.*, land watered by atmospheric moisture (*liyál* in Turki signifying rain). *Liyáli* lands are principally cultivated in mountainous localities, where, on the one hand, it is impossible to raise water from the valleys, which are for the most part narrow, and, on the other, where rain sometimes assists the raising of crops.

Irrigated land in the Turkistán district gives excellent and always certain harvests, whilst the unirrigated gives scanty crops, which are dependent on the amount of atmospheric moisture.

From what has been said the importance of water in the Turkistán district is clearly seen: rivers, and the *ariks* derived from them, are distributed like veins in the human body. Where water is scarce every drop for irrigation is calculated. From an early date, in Central Asia an excellent canal system of rural economy has been worked out, having for its object the regular distribution of water. Water for the irrigation of arable land, gardens, and kitchen-gardens, is not wasted, but by the aid of a second net-work of *ariks* is returned into the main reservoir or feeder. Supervision over the regular and rightful distribution of water, and over the carrying out of the general labour of constructing and cleansing the *ariks*, is vested in every settlement in one or several elders called the *arik-aksakál*[1].

The bringing water to the desert by means of *ariks* to irrigate it signifies the bestowal of life; and thus it is that the most distinguished and the wisest rulers of Central Asian peoples are those who have constructed irrigation canals.

---

[1] *Aksakál* in Turki means elder, or, literally, grey beard.—*Trans.*

With the establishment of the Russian administration in Turkistán it will be readily understood that due attention was directed to the same subject. As a commencement, two immense canals were constructed, one in the Panjkand region (in the Zarafshán province), and the other in the Kuráma province, called the Zakh-arik, extending over 85 *versts* (56⅔ miles). Both these *ariks* from their size more nearly resemble rivers than canals.

Besides this, for a period of some years, the efforts of the Turkistán Government have been directed to discovering means to revive the enormous extent of country lying between the Sir-Daria, the Turkistán range, and the Kizil-Kum sands. This extent of country, known under the name of the *Gólodnaya*, or Hungry steppe, notwithstanding the present almost complete absence of any capacity for human habitation, possesses considerable promise for the development therein of colonization and agriculture, conditionally on the introduction into it of irrigation canals. All the above-mentioned country has been explored, levels have been taken, and in the year 1873 access to it was obtained by means of the grand canal from the Sir-Daria.

This work requires some thousands of workmen and a large pecuniary expenditure; but the advantages hoped for from it fully justify the cost. At the present time this canal has been conducted to a distance of 20 *versts* (13⅓ miles) from the Sir. When the work will be completed it is difficult to determine. It is supposed that the surface which this canal irrigates is one and a half times larger than the surface of the Zarafshán province. It may therefore be hoped that the tract in question will produce an outcome of 6 million *roubles* (about £750,000). In Central Asia the people protect themselves from the dry land by water in the same manner as the Dutch protect themselves from the sea by the dry land; the conquest of both the one and the other is an honourable triumph of human skill and perseverance over hostile nature.

Colonization and agriculture are scattered sporadically through the Turkistán region in the form of *oases* along the valleys of rivers.

The cultivated spots or *oases* where, at the present time, agriculture more especially flourishes in the Turkistán district, are the following:—

(1) The principal agricultural *oasis* of the Turkistán district is indisputably the *oasis* of Fargána. This *oasis* comprises the best portion of the Fargána province; it extends in a long continuous band, which has the form of an ellipse broken on the north-west. This band commences about 30 *versts* (20 miles) west of the town of Khokand, and extends thence through that town, and *vid* Kishtán to Margilán, whence it turns north-west through the towns of Ass-ak and Sháhrikhán to Andiján, where it again changes direction to the west through Balik-ehi to Námangán, and terminates 14 *versts* (9⅓ miles) from the latter at the large village of Ture-Kurgán.

This continuous band of the Fargána *oasis* extends over more than 250 *versts* (166⅔ miles); the central breadth of the *oasis* is about 30 *versts* (20 miles).

It is mainly watered by the left affluents of the river Sir, which, after descending from the Alai range, do not reach the main river, *viz.*, the rivers

Isfára, Sokh, Sháh-i-Mardán, Isfairám, Naukát, and others. These, in the latter parts of their course, are diverted into innumerable canals that cover with a net-work the southern branch of the main Fargána *oasis, viz.*, the towns of Khokand, Margilán, and Ass-ak and their neighbourhood.

Besides these, in the valley of Fargána, agricultural *oases* appear like spots or stripes along the mountain rivers; Isfára, Isfairám-Sai (Chemián and neighbourhood), Ak-Buri (Osh and neighbourhood), along the course of the Kára-Daria; the small interval between the Kára-Daria and the Nárin (a part of Ike-Su-Arasi), and lastly a small *oasis* composed of twenty-one villages, along the course of the river Háva-Yádra in the Chust district.

(2) The Zarafshán *oasis* extends in a band along the course of the river of the same name, from the *kishlák* of Shirin-Khátin. This *oasis* is prolonged far into Bukhárian dominions, and extends to Lake Kára-Kul, which the waters of the Zarafshán river sometimes reach. In the borders of the Zarafshán province, the river Zarafshán waters part of the mountain country of Panjkand, Sámarkand, and Kátta-Kurgán.

The amount of land watered by the Zarafshán is as follows:—

	No. of nomad Camps.	No. of *Tanaps.*	Crown *Desyatinas.*
In the mountain country . . .	1,554,$_{5}$	77,725	20,240½
„ Sámarkand Division . . .	5,854,$_{8}$	292,740	76,234½
„ Kátta-Kurgán Division . .	2,483,$_{40}$	124,152	32,331¼
TOTAL .	9,892,$_{\frac{34}{100}}$	494,617	128,806¼ [1]

In Bukhárian dominions the Zarafshán waters the Khatirch and Kermina Begships (1,250 and 2,170 nomad camps respectively), 8 Bukhárian *tumens* (9,050 nomad camps), the town of Bukhára and environs (5,770 nomad camps), Zia-ud-din circle (2,970 nomad camps), and the Kára-Kul *tumens* (1,500 nomad camps).

In this way the whole surface of the Zarafshán *oasis* contains 32,602,$_{34}$ nomad camps, comprising 4,075,$_{4}$ square *versts* or 83,$_{17}$ square geographical miles[2].

The fertile portion of the Zarafshán valley is specially known under the name of Minkala, an island formed by the division of the Zarafshán into two branches, the Ak-Daria and the Kára-Daria; its length is 95 *versts* (63⅓ miles), and its average width 10 *versts* (6⅔ miles).

On the Upper Zarafshán, and on some of its tributaries, agriculture is carried on by the mountain inhabitants, but on account of the stony nature of the soil, and the narrowness of the valleys, it does not attain to any considerable dimensions.

(3) The Kuráma *oasis* comprises part of the province of the same name, and lies in a valley near the rivers Chirchik, Angren, and Kajigen. To this *oasis* belongs Táshkand and a number of the Kuráma villages, amongst which the most considerable are Biskand (Pskent) Buka and

---

[1] Soboleff. "Geography and Statistical information relating to the province of Zarafshán." 1874, page 89.—*Author.*

[2] *Ibid*, page 99.—*Author.*

Old Chináz. The amount of land here fit for cultivation may be estimated at 379,046 *tanaps*, or 63,174½ *desaytínas*[1].

(4) A strip of land extending from Khojand westerly along the Turkistán and Nuratau ranges; here canal water is obtained, at first from the Sir-Daria, and afterwards from the mountain streams and rivulets falling from the northern slopes of the above-named mountains. In this strip, besides an extended chain of villages, is situated the town of Khojand, and the following more considerable points: Nau (the centre of extensive rice cultivation), Ura-Tube, Zámin, Yám, and Jizák.

(5) The *oasis* of the Upper Aris, and the tributaries falling into it: in this *oasis* settlements occur much less frequently than in the foregoing. The principal are those of Chimkand, Sairám, and Máukand.

(6) The Upper Aris *oasis* consists of a belt extending from the river Ters through the town of Aulie-Ata along the northern slopes of the Alexander range, nearly to the Buám defile. This belt is watered by the rivers Ters and Talás, afterwards by the mountain torrents falling from the Alexander range, and composing in part the sources of the river Chu, and in part losing themselves in the desert, and lastly by the river Chu itself, between Tokmák and the Buám defile. Here agriculture is principally carried on by nomad people. Of settlements, there are the town of Aulie-Ata, the small colony of Merke, the Russian villages of Bailovodsk (Ak-Su) and Alamedinsk, the towns of Pishpek and Tokmák, and the Russian hamlet of Tokmák, lying 5 *versts* (3⅓ miles) from the town of the same name.

(7) A belt from the Kastek boundary along the northern base of the Trans-Ili-Ala-Tau range. This belt is watered by the upper streams composing the left sources of the Ili; some of these, however, do not reach the main river, losing themselves in the desert, or being distributed into canals. In this belt are found the following settlements: the Russian village of Kazán-Bogorodsk (Uzun-Agách), the hamlet Lubóvnei (Kaskelen), the town of Vairnoye, the station of Sophia, and the hamlet of Nadéjda (or the hamlet of hope).

(8) A narrow belt around lake Issik-kul. This belt is watered by the mountain rivers falling into the lake. Here agriculture is the occupation of both the Kirghiz and the Russian settlers, whose villages surround the eastern half of the lake, *viz.*, the village of Slivkíno, the town of Kára-Kul, the villages Aksu, Preobrajénsk, Uitál, and Kungei-Aksu.

(9) The valley of the Upper Ili, from the town of Borohuzir almost as far as the point of junction of the Tekes with the Kunges: this is called the Kulja *oasis*. Here agriculture is the occupation of both the nomad Kirghiz and Kalmaks, and of the settled population, *viz.*, the Taránchis, Dungáns, Chinese, and Manjurs. This country has from of old been distinguished by an abundant cultivation. But the successive revolts of the Dungáns against the Chinese, and of the Taránchis against the Dungáns, and the perpetual mutual dissensions, continued for about eight years, have ended in ruining the country. In the year 1871 the conquest of this country by the Russians was effected, and under their government it is recovering little by little from the calamities which had agitated it.

---

[1] Terentieff. "Turkistán Annual," No. II, 1873, page 111.—*Author.*

(10) A strip of land at the upper portions of the rivers Káratal, Ichke, Bien, Ak-Su, Baskán, and Lepsa, which precipitate themselves from the Jungária Ala-Tau, and flow in the direction of Lake Balkhásh. Some of these reach that lake, whilst others lose themselves in the deep sands which surround it with a wide belt on the south. In this *oasis* the principal points of habitation are the hamlets of Koksu (on the river Koksu, an affluent of the Káratal), Kárabulák, Saribulák, Arasán, Abakúmoff, Sarkán, and the stations of Kopál and Lepsinsk.

(11) A belt along the southern base of the Tarbagatai range and along the course of the Upper Ayaguz, falling from the north into Lake Balkhásh and the Urjár, Khátin-Su, and Emel, which fall into Lake Ala-kul. Of cultivated points there are Sergiopol, the station of Urjár, and settlements on the river Khátin-Su, Kok-Tum, and others.

(12) Among the number of places suitable for agriculture should be included the expanse of country extending for over a thousand *versts* (more than 666 miles) along the course of the Sir-Daria from its mouths to the Hungry Steppe, which has been already mentioned. Through the whole of this territory are to be seen numerous old, forsaken canals (*ariks*) that formerly extended from the bed of the river for many miles deep into the surrounding country. At present the fields lie almost immediately on the river banks. In such places the Kirghiz alone occupy themselves with cultivation and they to a comparatively small extent, growing only millet. Besides along the banks of the Sir-Daria, Kirghiz cultivation exists on the branches of the same river, *viz.*, the Yáni-Daria and the Kuván-Daria. It is difficult to say what proportion of the land, amounting to more than 40,000,000 *desyatínas,* belonging to the nomads is fit for irrigation and agricultural labour. But there are certain bases for an approximate estimate of the territory not yet touched by cultivation, and which might prove of use for the development of colonization in that country. Not counting the sterile desert and mountains, the proportion between land already occupied by settlements and that not touched by cultivation, consisting of the grazing-ground of the nomads, when compared with the population of the several provinces of Russian Turkistán, may be approximately defined in the following manner :—

Provinces.	Settled Population according to households.	*Kibitkas* of the nomads.	*Desyatinas* of soil.		*Desyatinas.*	
			Under settlers.	Grazing ground of nomads.	Per household of settled population.	Per nomad *Kibitkas.*
Semiraitchensk .	25,891	162,561	695,650	18,125,000	27	111
Sir-Daria . .	94,681	124,325	215,000	18,143,300	2	146
Fargána . .	121,140	24,798	600,000	3,000,000	5	161
Zarafshán circle .	69,683	...	191,600	1,300,000	3	...
Amu-Daria Section . . .	13,286	8,156	45,700	1,300,000	3	159
Total .	324,681	319,840	1,749,350	41,868,000	...	...

If we take into consideration that the cattle-breeding of the Semiraitchensk nomads is carried on not merely without hindrance, and that, on the contrary, under given circumstances, it might increase; also that an area of 100 *desyatinas* of pasture ground per nomad *kibitka* affords a sufficiency, it may be supposed that a fourth part of that which is available, *viz.*, 10 millions *desyatinas*, might be brought under cultivation without interfering with the nomad rural economy, or, at least, without curtailing its present dimensions.

What is wanted is a system of irrigation that would render the soil fit for tillage, and re-establish that system of land-tenure which obtained from of old throughout Central Asia.

According to the *Shâriat*, or Mussulmân code, all land is classified under two principal kinds, *viz.*, land which is not fit for cultivation and that which can be tilled. To the former no one has any definite rights, neither State, nor commune, nor private individuals. Everyone can, however, use it without restriction, whether for the pasturage of cattle, or for the supply of fuel. Arable land, on the other hand, is divided into that which is still untilled and into that already brought under cultivation. The State can take up the first, and give it out to anyone to till; the second is then classified as *ushri*, *herádj*, and *mámlkat* or *amlak*.

To the class of *ushri* land belongs that which was parcelled out by the State in a conquered country, and set apart for military purposes. The revenue on such land is fixed at one-tenth of the crop, and this is calculated, not on a standing but on a cut crop.

Herádj lands are those which have been left in possession of the conquered races; from such is levied a land tax bearing the same name. This tax may be either *herádj mavázi*, *viz.*, fixed and constant, or *herádj menosim*, or dependent on the harvest and proportionate thereto.

Mamlikat or *amlak* land is such as is placed by the State at the disposal of private individuals, either on lease or in return for a fixed rent calculated at the rate of from half to one-fifth of the actual crop. The payment in this form likewise bears the name of *herádj*, whereas cash payment for land leased is called *tanap*. To the same category belong the *wakf* lands, the greater portion of the income of which goes to support Mussulmân religious institutions, such as mosques and seminaries.

Generally speaking, according to the Mahommedan law, exclusive right does not exist. Neither the State nor private individuals have the right of unlimited disposal of land. By that law there is the right of possession and of the enjoyment of land, subject to certain conditions influenced by the climatic properties of the particular country. Every such individual right is dependent on the law rendering the cultivation of the land obligatory. Any man who may convert barren land into fruitful soil receives the same as *milk*[1] or in possession. Land thus once brought under cultivation, on remaining fallow for three years, is held by the State to be barren, and is made over to whomsoever wishes to cultivate it.

In the Zarafshán circle almost all the soil is *milk* land, *i.e.*, that which has been made over by the State to private individuals. In most other localities, too, the same sort of land exceeds in extent that of other kinds.

Indeed, at first it was the sole exclusive description, but some passed out of cultivation in consequence of the labour of one man being insufficient to fertilise the whole. In fact, in order to make the poor soil of Central Asia productive, a large expenditure of labour is necessary, and likewise the construction of a vast system of irrigation which involves the cleaning and repairing of the canals at every spring season. All this, except in rare instances, is impracticable for one man. This state of affairs led to the introduction of that excellent organisation of communal labour, which, while it enables each individual to pursue agriculture, renders it possible to maintain life in the deserts of Turkistán.

---

[1] The word *amlak* is the plural form of *milk*. If land of this description has been freed from the payment of taxes it is called *milk-hur-halis*, or *exempted land.—Author.*

The *kosh*, or pair of oxen harnessed to a plough, the attendant, and the necessary implements form, so to speak, the unit of the communal system of agriculture.

The number of *kosh* allotted to any particular locality is determined by the extent of its fertility. Contingent on the same is the acreage which each possessor of a *kosh* has the right to cultivate. And this is so because where there are owners of several *kosh*, there are poor people who can only keep one *kosh* amongst them.

Before the commencement of the work, the *Arik-Aksakáls* determine what portion of the land under their charge has been longest fallow and should be brought again under cultivation. On the eve of field operations, the *Aksakáls* visit the streets of the towns, and call out to the people that all who wish to take a field are to assemble with their *kosh* at a given time and a given spot. Each individual who consents goes to the appointed place with his *kosh*, and he then receives his allotment of the land, subject to the condition that he will maintain and repair the irrigation system in connection with it. These joint obligations begin early in the spring, and consist in the clearing of the water-courses (*ariks*), *i.e.*, the main channel and its branches. The principal canals[1] lead directly from rivers, rivulets, or lakes. From these are thrown out the second-class canals, and from these again are diverted branches of all sizes. Dividing and ramifying into innumerable minute canals, they are like a tree which throws out its branches of decreasing size, except that the canals, fed, it may be, by other branches *en route*, may again unite and form one or several large arms that in their turn restore the water to the parent stem. In the main channel and its branches dams are thrown up and these regulate the supply of water.

Early spring (*i.e.*, the end of February, old style) is the season for cleaning the smaller courses, the larger or main channels being repaired in the month of March. This arrangement is so contrived that each husbandman, before the shutting off of the water in the main canal, may have time to water his own field. On the completion of the cleansing of the minor branches, the dams are removed gradually according to the pressure of the water and to the required supply in each separate feeder.

The cleansing of the canals is considered so important an undertaking that it is carried on in presence of the Kháns or *Begs*, the *Arik-Aksakál* superintending the work. The main canals hold water the whole year round; but towards the end of October their level is lowered so that they cease to feed any of their lateral branches which thus remain dry until the following spring.

---

[1] In Central Asia there is no distinctive title for the main and its branches, the word *arik* being applied to both.—*Author.*

The whole of the canals are not shut off in winter, but only those that are liable to a sudden influx of water.

In cases where the water cannot be raised with the aid of dams, a special lifting apparatus is employed, called in Turki *chigir,* and in Tájik a Persian wheel. The construction of this is as follows: A vertical axle, supporting a wheel, turns another wheel with a horizontal axle. In connection with the latter is a third wheel of large dimensions (7 feet, or perhaps more, in diameter), to which are fastened earthen pitchers that ladle out their contents as the wheel revolves. The water thus thrown out is conducted into a reservoir, whence it is led along a duct to the field that is under irrigation. To the vertical axle is attached a pole, whereto is yoked either the horse or mule or camel that is employed to turn the wheel, and the eyes of this animal are bound. The greater number of these *chigirs* are constructed in the Khánate of Khiva. Sometimes the Kirghiz use an ordinary scoop instead of the Persian wheel, and this substitute is exactly similar to the scoop employed for the baling out of Russian barges.

Irrigation is in some rare instances carried on without the medium of a canal. This is effected when the water rises with the spring floods, and brings with it a fertilising ooze. Of course it is apparent that only land in the immediate locality of a river can be so watered, whereas the canal system admits of the carrying on of irrigation at a distance of 100 *versts* or more from the diversion of the main supply.

When fields are prepared for cultivation by means of the diversion of canals, the oldest *Arik-Aksakál,* on behalf of a given town, marks out the land into as many portions as there are *kosh* set apart for the work. The value of each portion must be exactly equal, because the commune looks carefully after this so as to see that in the allotment no individual interest is marred. For the casting of the lots, each owner of a *kosh* throws his mark into the fold of the coat of the man beside him. These marks are then spread upon the staked-out land, and each receives as his share of *chak*[1] the bit of land whereon his own mark lies. The owners of several *kosh* may, with the consent of the commune, take as their *chaks* bits of land that lie together.

During the year the *Arik-Aksakáls* let the water on each *chak* in turn, and they so arrange this that no one is cheated. Indeed, so strict is their watch that those agriculturists who may not require water have their courses blocked, and they cannot then touch the supply without the permission of the *Arik-Aksakáls.*

Consequent on there being no system in Turkistán which would regulate the rotation of crops, after the gathering-in of one harvest the land lies fallow. Consequently, a field once tilled is passed by, and another taken up as many times as the extent of arable land in the country will permit, subject, of course, to the condition underlying the dimensions and capabilities of the irrigation system which is in use. In autumn, when the labours of the field are over, the courses leading to the fields are closed up with clay, and the water-supply is then confined to the main canal.

---

[1] A name which denotes a lot.—*Author.*

According to custom, the communal lands pass into the permanent possession of the individual who establishes a garden on his *chak*, builds thereon a house, sows a crop of *jenushka* or lucerne grass (*Medicago sativa*), and surrounds the whole with an earthen wall. The natives call such a plot, which partakes of the character of manorial land, *hayát*, *i.e.*, closed-in land, to distinguish it from *dashti*, or open plots. On *hayát* land, besides lucerne, madder, tobacco, maize, *bakhlajni*, hemp, beans, capsicums, and kitchen-garden produce of all kinds are raised. *Hayát* land may likewise be situated outside the confines of a settlement, but it is imperative that it should have an encircling wall. The person who comes into the possession of *hayát* land is obliged, as a primary condition, to furnish a *kosh* for the cultivation of the communal lands. The various stages of cultivation are as follows : ploughing, manuring, watering, and, after an interval, harrowing.

The agricultural implements of Turkistán are as original as is its system of husbandry. The ground is ploughed up generally with the aid of a pair of oxen or even cows; the Kirghiz sometimes use camels. The *sabán*, or two-pronged plough, somewhat similar to the Russian, is used for the tilling of the land. This implement is a sharpened block of wood, tipped, it may be, with an iron point, and fastened at a sharp angle to a long pole. On the front of this pole is laid the yoke, a beam which is about 7 feet in length. Cords are let into this at either end and the oxen are made fast. The plough is directed by one man, who holds on to two forks that are let into the pointed beam, the plough turning up about 7 inches of earth.

To the honour of the natives of Central Asia it must be said that their ploughs, with all their imperfections, are better than the *sokha* in use in Great Russia, though they are inferior to the Little Russian plough. Over the former they have this two-fold superiority, *first*, in that they have a pole instead of a shaft; and *secondly*, that this pole is fastened to the share lower down, a fact which obviates the constant pressure of the ploughman's hand. The Central Asia *sabán* differs from the plough of Little Russia in that it has no heel.

Harrowing is carried on by means of a beam in which are fastened long wooden teeth. This beam is dragged by a pair of oxen, almost in the same way as is a plough. In order that the teeth of the harrow may go deep into the soil, two or three men stand on it, whilst the animals draw it through the field.

In the settled portions of Turkistán, and also in the independent Khánates of Khiva and Bukhára, the soil, owing to the mildness of the climate, gives two crops in the year. The field that has yielded a winter crop of wheat or of barley is sown towards the end of May (old style), and after the harvesting of either crop a second sowing takes place during the same year of either *másh* (peas), millet, or carrots, and less frequently of sesame, poppy, or lentils. A second sowing is reaped and gathered in, and then the field is prepared early the next year for the spring sowings. In this way every quoin of land, by this system of rotation[1], gives one winter crop and two spring harvests before it is allowed to become fallow.

For the latter crops the greater portion of the fields are sown with rice and sorghum (*jugára*). Besides these two principal productions, the spring crops consist of cotton, lucerne (*jenushka—Medicago sativa*), whilst on small portions of the land are grown melons of various kinds, cucumbers, pumpkins, onions, and a few carrots.

---

[1] The author has stated above that there is no rotation of crops in Turkistán.—*Trans.*

After the reaping of the spring crop the fields are allowed to become completely fallow (*shidgár*), or it may be that on occasions they take from the land a crop of *másh* (peas).

All that has been said above refers to the watered or irrigated fields. On the *lálmi*, or rain lands, are sown spring crops of wheat, barley, and *kunak*[1]. The latter is for the most part sown by the nomads.

With regard to the methods in vogue in Turkistán for the tilling of field growths, we learn much from the article of a specialist in that line, Mons. Brodovski, who has explained these methods as they exist in the Sámarkand circle[2].

The order and method of preparing the land for autumn sowings are as follows :—

Land which has been left fallow (*shidgár*) after the spring crops is brought under winter wheat or barley sowings from five to ten times in succession, the direction of the furrows being changed after each ingathering. On each *tanap* ($\frac{1}{6}$ *desyatína*, or 400 square *sájens*)[3] of fallow land from 40 to 50 cart-loads of dung or of scrapings, taken from the roads (*turpak*), are heaped. The supply of manure is so calculated that each *desyatína* of ground (see foot-note) may receive from 240 to 300 cart-loads, or, reckoning each cart-load to weigh 10 *puds*[4], from 2,400 to 3,000 *puds*. These loads of manure are kept during the winter in large heaps, where they rot in course of time, and when they come to be thrown over the land are almost in a state of powder. The soil thus enriched is now well ploughed over, and in the earlier part of September the same process is repeated from two to six times, the plough passing along and across the field. In the earlier portion of the month in question, after the last ploughing is over, the winter wheat or barley is sown in trenches. The quantity of either grain used in these sowings is 2 *puds* per *tanap*, or 12 *puds* per *desyatína*.

If the crop be of wheat, it is watered two or three times while it is growing. The first watering takes place as it begins to form a ear, the second as it flowers, the third during the expansion of the head.

Winter barley, as a general rule, receives only one watering, *viz.*, when it begins to ear.

The winter crop is gathered in at the end of May or beginning of June. The stalks are cut with a notched sickle (*urak*), and are left as they fall for two days, after which they are gathered into sheaves.

The grain, instead of being thrashed, is trodden out by oxen or horses on a space especially prepared (*khirmán*). The animals are made to walk over the scattered sheaves, moving round and round, until the whole are beaten out. A *tanap* of well-manured land will yield 5 *batmáns* of grain

---

[1] A small kind of millet.—*Author.*

[2] See "Compendium of Russian Turkistán," No. 2 for 1872. Regarding the Agricultural Industry of the Khivan Khánate, see also an Article by myself in the *Voyenni Sbornik*, No. 4 of 1874, entitled "The rural economy of the Khánate of Khiva."—*Author.*

[3] A *tanap* varies in size: in Bukhára it is equal to $\frac{3}{8}$ths *desyatína*; in Khiva to $\frac{1}{3}$rd *desyatína*: a *desyatína* = 2·86 acres.—*Trans.*

[4] A *pud* = 36 English lbs.—*Trans.*

(the Sámarkand *batmán* = 8 *puds* = 288 lbs.), that is, twenty-fold. An average wheat harvest in the Sámarkand circle is reckoned at fifteen-fold[1].

The straw (*saman*) which is left upon the floor (*khirmán*), after the treading out, in a crushed and broken condition, is used to mix with clay in the manufacture of sun-dried bricks and clods for various building purposes. They also burn some of it and use the ashes to manure the fields.

The quantity of barley grain per *tanap* sown as a winter crop equals the amount of wheat, *viz.*, 2 *puds* or 12 *puds* per *desyatína*. The harvest yield amounts to five *batmáns*, or twenty-fold. The grain ripens towards the end of May.

After the winter harvesting of the wheat and barley, as we have said above, the fields receive a second sowing, either of peas, millet, *kunjut* (*Sesamum orientális*), lentils, carrots, and less frequently of poppy-seed.

The land that is to receive the millet, peas, sesamum, and lentils is ploughed over once or twice, but in the case of a crop of carrots, in addition to the ploughing it is also trenched with a *ketmen*, or hoe, in the teeth marks of which are placed the seed. For poppies the ground, besides being ploughed over three or four times, is harrowed, and the seed is sown behind the harrow. Crops of peas, millet, sesamum, and poppies are only watered once, and when the land is rich are not watered at all. Lentil sowings receive two waterings, carrots four or five.

Millet (*tarik*) seed per *tanap* is sown to the extent of 5 *cháriks*[2], that is, somewhat more than 3 *puds* per *desyatína*. There are three varieties of millet, white or red (*ak* or *kizil*), *tarik*, and *chokán*. The last is preferred, both because it yields a considerably better crop, and because it is the first to ripen. Two *batmáns* or 16 *puds* per *tanap* of *tarik*, *i.e.*, 100 *puds* per *desyatína*, is considered an average crop. This amounts to thirty-fold. In the Khivan *oasis* millet yields from thirty to fifty-fold.

Másh (*Soya hispida*)[3] is a small, greenish-grey pulse, sweetish to the taste. After being boiled in water, it is used as food, either as soup, or else mixed with rice as a sort of gruel. Sheep are fed upon its stalks. The sowing per *tanap* varies from 1½ to 2 *puds*, or an average of 10 *puds* per *desyatína*. *Másh* yields a very large crop, and ripens in three months. Sometimes it is grown upon fallow ground.

Kunjut, or sesamum, also ripens in three months from date of sowing. It is sown in quantities calculated at 3½ *puds* per *desyatína*. After it ripens it is cut down and bound in sheaves, which, after lying as they fall for a period of eight days, are shaken out.

The sheaves are then spread out in the sun for a further period of three days, after which they are shaken a second time. Three days again intervene, a third shaking ensues, and the stalks are then considered clear of all their seed. With this process an average yield is from 5 to 6 *puds* per *tanap*, or 36 *puds* per *desyatína*. The sesamum stalks are used as webs, and the seed is crushed for its oil. From one *batmán* (8 *puds*) of the best sesamum seed 6 *puds* of oil are extracted. In order to obtain this oil, cotton seed (*chigit*) is generally mixed with the sesamum seed, in the proportion of one part of the latter to four of the former.

---

[1] Mons. Soboleff (in his "Geography and Statistics of the Zarafshán circle") puts down an average harvest in the Sámarkand circle at ten-fold, but we think it may really be less. In this case it would be impossible to calculate on the basis of data furnished by the amount of the *herádj* tax collected in the Kuráma district; for example, on this basis, an average winter harvest would mean five-fold and a spring crop eight-fold, figures that are evidently below the mark.—*Author.*

[2] A Táshkand *chárik* or *chairik* = 6¼lbs. ; a Sámarkand *chárik* = 5 lbs.—*Trans.*

[3] Dr. Scully in his list of the plants of Eastern Turkistán gives the Botanical name of *másh*, which he calls a bean, as *Phaseolus Mungo*.—*Trans.*

The oil is used in food; the refuse of the presses is used to feed horned cattle and camels, for both eat it with alacrity.

Poppy (*mak* or *kuknár*) seed is sown only in small quantities, *viz.*, 2 *chárìks* (10 lbs.) per *tanap*. The yield is two *batmáns* or 16 *puds* for the same extent of ground. The seed is used in the manufacture of oil, and the heads afford a narcotic beverage called *kuknár* [1].

Lentils (*adas*, *yasmus*) are likewise generally sown in small quantities. The seed ripens within three months from date of sowing.

Carrots (*sabzi*) are not much grown. The crop of these is gathered in four months' time.

Husbandmen (*piasrekárs*) whose lands are of limited extent, after the ingathering of their second crops, sow on the same spot during the second year a winter crop, and before doing so plough up the land from four to five times [2]. After yielding the second of the winter crops the land is allowed to become fallow.

The following are the spring crops: rice, sorghum, cotton, flax, fruits of all kinds, and carrots.

For the sowing of rice or *shál* the ground is thus prepared. After the ingathering of wheat or other second crop of the previous autumn, ploughing is twice carried on. When the spring has set in the ground is ploughed again eight times and flooded, the water being allowed to remain for three whole days. The water is now let out, and the field divided off into squares marked out by ridges of a considerable height.

After this operation the water is once more turned on into the marked-out field until it reaches a level of about 14 inches. Each square is now worked over with a harrow, and the seed is sown in clumps. For the first eight days after the sowing the water is kept at a level of 14 inches. After the expiration of this period the rice begins to sprout, and the supply of water is arrested for three days, in order that the soil may have time to get heated. The water is once more let on until it reaches a level of 5 *vershóks* (about 8¾ inches), at which it is maintained for twenty days. The flow of water is then again checked for three days, and again let on, so as to reach the former level of 14 inches, at which it is again kept for twenty days. The same diminution and increase again ensues, but on the last occasion the water is maintained at its normal level until the ripening of the rice, *i.e.*, during a period of sixty days. When this has taken place the water is let out of the fields, and after about a week, during which the soil has become sufficiently dry, the crop is ready for cutting. The fallen rice is left for three days to dry, and is then bound up in sheaves. Two *puds* per

[1] To obtain this the seeds are taken out of the heads, the latter are then reduced to powder, and left for about half hour in water. The mixture is now strained through a cloth and cleared of all sediment. This infusion has an intoxicating effect, and so takes the place of *vódka*, the use of which is forbidden by Mussulmán law.—*Author.*

[2] Excepting in cases wherein the land has been under carrots. In such cases ploughing only takes place twice before the sowing of the winter crop of the following year.—*Author.*

tanap being the amount sown, the yield will be from 32 to 80 *puds*. Thirty-fold is considered an average crop.

The various sorts of rice are generally classified as of two kinds, *viz.*, white, or *ak-shál*, and red, or *kizil-shál*. The bazaar price of rice per *batmán* is from 30 to 40 *kokans, i.e.*, from 75 *kopaikas* to one *rouble* (1*s*. 10½*d*. to 2*s*. 6*d*. per *pud*).

After the ingathering of the spring rice attention is now paid to *jugára*, or *sorghum*. This plant reaches a height of over 9 feet, and gives grain which supplies food for both man and horse. The grain is ground into flour, and eaten in the form of cakes. When the supply of barley fails the natives feed their horses on the same grain to the extent of 7 lbs. per horse *per diem*. The green stems of the plant when cut up fine afford an excellent fodder for the milch cattle; whilst the leaves are eaten by the sheep. The stems also when dried are used as fuel.

Ground that is to be placed under *sorghum* cultivation receives from 40 to 50 cart-loads of manure, and is ploughed from five to ten times. Between every two crossings of the plough it is harrowed over. After the final passing of the plough the ground is watered, and when sufficiently dry is sown over. The sowing takes place in the earlier days of May (old style). When the crop has risen 7 inches above the ground the field is hoed and thinned out.

From 10 to 15 days after this process is over the *sorghum* will be 14 inches high. The field is once more hoed and all the weeds removed that would otherwise strangle the growing crop.

The crop now receives its first watering, and in the space of from 10 to 15 days a second. The third watering takes place when the plant begins to ear, and the fourth after the flowering of the plant and as the grain is swelling.

Sorghum will only ripen in October. The heads or ears are all collected in bundles, and the stems are bound up in sheaves. The heads are then thrashed and winnowed.

From 10 to 15 lbs. of grain being sown per *tanap* the yield will be from 16 to 40 *puds, i.e.*, fifty to one hundred and sixty-fold.

In cases where a field has been planted two years in succession with winter and spring crops, after a harvesting of *sorghum* they usually sow either flax that receives no manuring, or a crop of vegetables which is manured.

In Turkistán, and throughout Central Asia generally, flax is only grown for the manufacture of oil from its seed, the stems not being made use of because their fibre is both coarse and thick. The amount sown being from 1½ to 2 *puds* per *tanap*, the yield will be from 8 to 12 *puds*. The market price of flax-seed is from 2*s*.6*d*. to 5*s*. usually per 36 lbs.

Indau, or Eruca, grows up amongst the flax, and from the seeds of this weed they extract an oil that is mixed with the oil pressed out from the seeds of the flax.

Pure oil of *indau* seed, which has an unpleasant taste, is used in native veterinary practice for horses' sores.

As a spring and occasional crop, peas (*burchak*) and *nakhód* (*Cicer Arictínum*) are sometimes raised. With the ground peas the natives sprinkle the straw issued for the fodder of their horned cattle.

Land that has been used for spring crops of grain is left fallow.

Besides the plants which have been named as in general cultivation and subject to rotation, there are others that are raised in the enclosed lands or *hayáts* alluded to above. These are lucerne, madder, tobacco, hemp, vegetables of kinds, maize, and kidney beans.

Lucerne, or *jenushka*, is a most important plant for fodder, as it alone is dried as hay. It is therefore cultivated on a large scale. The advantages attending the sowing of this plant are vast. A field once sown over with lucerne affords nourishing hay for cattle that can be reaped and made over a period of ten years almost without any care. Fresh crops of it can be raised from one sowing four and five times in the course of one season. From a mown field of one *tanap* in extent from 150 to 200 bundles of hay can be reaped; in other words, from 90 to 140 *puds* per annum.

After ten years the soil is broken up and re-sown, and once in two years the crop of lucerne receives some manure[1]. The best crop of lucerne is the second; the last or autumn crop has thick stems, and but few leaves.

During the summer the natives, as a rule, feed their horses on green lucerne. But this method is scarcely wise, as its practice leads to slight enfeeblement of the animal. Dry lucerne is much more nourishing, and is eaten more readily by a horse. The natives, before giving their horses lucerne (either fresh or dry), usually chop it up with a sickle of peculiar shape into small pieces, so that the animal may eat up the whole, whereas, when the lucerne is given out uncut, the horse frequently picks out the heads and throws the stalks aside.

Lucerne is bound up in sheaves, and these are sold by the hundred. The price varies in different localities, and with each season of the year. As a rule, it is dearest in the winter time, and cheaper during the summer. The summer prices are 1 *rouble* and 40 *kopaikas* (about 3*s.* 6*d.*) per hundred; the winter about 4 or 5 *roubles* (10 or 12 shillings) for the same amount; or the price in the latter season may even be as high as 12 *roubles* (30 shillings) per hundred, as was the case at Sámarkand during the winter of 1871.

In order that seed may be gathered from a lucerne crop, portions of the third year's growth are left untouched, and these yield from 6 to 8 *puds* of seeds per *tanap*.

Madder, or *Ruyan* (*Rubia tinctor*), is cultivated for its root, which is used as a dye, both for webs and leather, to which it imparts a reddish colour.

The soil for madder cultivation is thickly manured, and tended with great care. The seed is sown in layers, in quantities of about 1 *pud* to the *tanap*. During its growth the madder is abundantly watered and hoed. The roots are dug up during the fourth year from the date of sowing, the yield being 48 *puds* to the *tanap*. From this weight of moist roots, after the process of exposing to sun, there remain 32 *puds* of dried roots, and these when powdered yield 24 *puds* of dye.

---

[1] One sowing of lucerne will go on yielding for even 15 years; but after the tenth year the crop begins to lessen. Lucerne is watered every 15 or 20 days. In the Khivan *oasis*, from 1 to 10 ℔s. of seed is sufficient for a *tanap* of ground.—*Author.*

Tobacco (*tamákoo*) (*Nicotiana tabacum*) is cultivated in small quantities by the natives of Turkistán, and of the independent Khánates. Local tobacco, as used by them, is of two kinds; the *ak*, or white, for smoking; the *kok*, or green, used as snuff and for chewing.

Land under tobacco cultivation is tilled 15 times, carefully manured, and dug with a hoe in layers.

The seed is raised early in the spring, and the seedlings are then transferred to the plantation and planted out in layers.

Those plants which are intended for snuff manufacture are abundantly watered, so as to encourage the growth of flowers, the heads of which are plucked off. The headless stalks and leaves are then dried and ground to powder in mortars. For the preparation of pipe tobacco the leaves of the plant are first of all dried with the stem; they are then removed and heaped up, whilst in a slightly crushed condition, in a pit previously prepared, wherein they are left to get into a certain stage of fermentation. To further this the leaves, whilst they are in the pit, are covered over. After the expiration of from eight to ten days the leaves are taken out of the pit, dried in the air, and then packed in bags. From 16 to 20 *puds* of dried leaves is the yield per *tanap ;* but in the Khivan Khánate the yield is greater. It should be observed that tobacco might be made one of the most paying agricultural productions of Turkistán. Several Russian traders have already begun to sow the best kinds of American tobacco at Táshkand and at Sámarkand.

Through one of such experiments carried out at the former place by the merchant Pervushin it has been ascertained that one *desyatína* will yield a nett profit of 1,400 *roubles* (about £ 175)[1]. It is just, however, to add that other experimentalists who have sown tobacco, of both Turkish and American kinds, do not bear out what has been stated above. According to their views, tobacco imported into the country and raised in Turkistán loses its good qualities. Some years ago M. Agamáloff established a factory in Táshkand for the cutting of tobacco and the manufacture of cigarettes. One thousand *puds* of tobacco was the yearly amount cut. The cigarettes were distributed all over the Turkistán circle, but the Russian inhabitants alone purchased them.

Indian-corn, kidney-beans, and hemp, or *bang*, are everywhere cultivated, but in very small quantities, and as a rule on the edges of the holdings that are already under vegetable cultivation.

Of kitchen-garden produce the most common are melons, and after these water-melons, cucumbers, and pumpkins. In the smallest quantities are raised red-pepper, onions, carrots, beetroots, radishes, turnips, mushrooms or fungi, fennel, cumin. All these are raised in beds, or, as mentioned above, in enclosed ground called *hayát*.

Melons, water-melons, cucumbers, and pumpkins are sown on well-manured soil which has previously been ploughed over at least ten times. The sowing is done in rows. The rising plants are three times hoed and banked up with narrow ridges round each.

During the greater portion of the year melons afford most of the actual food of the natives of Central Asia; they are, moreover, the most abundant and most lucrative article of agricultural produce of Turkistán.

---

[1] *Turkistán Gazette*, No. 12 of 1870.—*Author.*

With good management a *tanap* will yield from 10,000 to 14,000 melons, and these, at the low rate of 5 *kopaikas* (1½*d.*) a piece, will bring in from 500 to 700 *roubles* (from £62-10 to £87-10.) Consequently a *desyatína* would bring in from 3,000 to 4,200 *roubles* (£375 to £525). M. Brodovski says that in the Sámarkand circle a *tanap* yields 5,000 melons.

The Khivan melons are renowned; they are usually sweet and succulent, but free from any great aromatic flavour.

The natives of Turkistán, and of Central Asia generally, know how to keep certain sorts of melons up to the month of May of the year following the crop. To effect this they hang them to the ceilings of cool chambers.

With the advent of the Russians into the country the cultivation of cabbages became diffused amongst the natives. The Russian inhabitants alone grow potatoes, since the natives still regard with disfavour this strange, and to them hitherto unknown, vegetable production.

The system of rural economy in vogue in Turkistán, notwithstanding the dearth of population and the general prevalence of ignorance, produces on the disinterested observer a favourable impression. Thanks to irrigation and to artificial enriching of the soil the local crops are very good, and with care reward the labours of the husbandman. A careful tilling of his land renders it possible for every able man to raise his crops; and so the fields in every direction are covered with a belt of green, not one *vershók* (1¾ inches) remaining barren. Wheat, as a rule, grows thick and evenly, whilst *sorghum,* or *jugára,* attains such dimensions as to cover a horseman's head. In respect of harvest ingathering, Central Asian crops can only be compared with those of the best farms of England. Artificial watering, besides insuring a green crop of some kind, brings with it other advantages, *viz.*, it drowns the eggs of the locusts, which in Central Asia therefore are not such a scourge as they are in Europe, and it moistens the atmosphere of the settled points which would otherwise be visited by unmitigated drought.

Although there are not in Central Asia famines in the European signification of that word, there are, nevertheless, deficiencies with different years. A greater or less amount of harvest will depend on the quantity of manure imparted to the land, and on the productive forces of the soil. Casual causes, too, have an influence on the crops, such as unseasonable irrigation, late sowing, bad cultivation, and the like.

The weather has no sensible effect in this respect, or, if it has, that effect is very weak. The natives say that the spring and summer rains greatly benefit the crops; but the possibility of frequent irrigation completely does away with the inconveniences occasioned by dry seasons. Heavy rains only injure those crops that have not already taken firm root, and it may be added that either summer or autumn rains in Turkistán are a phenomenon of rare and exceptional occurrence.

The nomad people of the greater portion of Turkistán territory sow crops of millet, barley, and wheat, the relative quantities of each being indicated by the order in which we have placed them. The settled inhabitants, on the other hand, mostly sow, first wheat, then barley, rice, millet, *sorghum,* and lucerne. Cotton is likewise one of the most important sowings of Central Asian fields. As stated above, melons are as a rule confined to kitchen gardens and other enclosed spaces.

Rye and oats are only grown by the Russian settlers in the Kázalinsk district of the Sir-Daria province, in the Sergiopol district, and in part of the Kopál district of the province of Semiraitchensk. Of the various sorts of wheat, *kizil-budai*, or the red variety, is considered to be the best. It has a full, reddish grain with greenish tips. It grows everywhere, but is specially luxuriant in the Aulie-Ata district of the province of the Sir-Daria. Aulie-Ata wheat forms the great bulk of that which is supplied by the contractors for the rations of the troops. On the spot its price is 20 *kopaikas* (6*d.*) the *pud.*

Wheat-grinding in Turkistán is everywhere effected by means of the water-driven mills (called *tigermáns*) of rude construction to be seen on every irrigating canal. It is in the town of Kázalinsk alone that there are 16 wind-mills set up at the cost of the Russian population.

In their construction of water-mills, the natives give the water a great fall, by causing it to descend through a long spout with a very sharp slope. The force of the water falls on the sloping teeth of the wheel, which revolves on a vertical axle, on the upper end of which lies the grindstone, or *tigermán-tásh.* These mills have, as a rule, but one motor, though occasionally one may come across some with two. The surroundings of the mill comprise a small cabin, often divided into two compartments, a porch, and the room wherein the grain is ground. The latter is raised on low piles; the flooring is of earth, and lies about 10½ inches above the ground. It forms the bed for the lower millstone. Above the latter is placed, between slender posts, the "runner," or *dúl-koráb,* which is of the same construction as in Russian wheels, *i.e.,* it is a tilted tetrahedral pyramid. Immediately above the aperture made in the upper stone, or "runner," is placed a "hopper," or scoop, which is kept in its place by cords. The grain from this receptacle escapes into the grindstone by means of a special contrivance in the shape of a wooden crook (*chagildak*) that takes the place of the Russian bow. One end of the crook is let into the "hopper," the other is attached to the grindstone. As the latter revolves, the crook receives repeated blows, and causes the grain to fall into the grindstone. Since there are no screens, the flour impelled by centrifugal force, generated by the revolutions of the grindstone, is thrown out on all sides, whence it is swept up by a workman with a fleece of sheep-skin (*ruak*) into something resembling a small bin (*arkitch*) put up in front of the millstones. In order to arrange the position of the upper millstone, *i.e.,* to raise or lower it, the following apparatus serves: the lower end of the axle of the wheel rests on a horizontal lever, one end of which is let into the piles whilst the other passes through the floor of the cabin, where it is secured with a wedge in such a manner as to admit of its having free play. Thus, in order to raise the millstone, *i.e.,* the axle of the wheel, it is only necessary to first raise the free shoulder of the lever, the wedge of which is thereby driven into another notch [1].

A mill kept constantly going will grind four *batmáns* [2] (42 *puds*) of grain in the twenty-four hours. Payment for grinding is not accepted in kind, *i.e.,* any portion of the flour, but in money, and the price is fixed at so much per *batmán.* The rates vary exceedingly, and rise or

[1] *Sbornik* of Russian Turkistán, No. 3 for 1872, page 30.—*Author.*

[2] The Turkistán *batmán*=10½ *puds.*—*Author.*

fall according to the level of the water in the *ariks*, or water-courses. Thus payment will fluctuate between 15 *kopaikas* (4½*d.*) and one *rouble* (2*s.* 6*d.*), or even higher per *batmán*. It should be observed that the number of mills in Turkistán is very large, and that many of them are often thrown out of work.

The sorts of flour are extraordinarily numerous, and are classified according to the grain in the ear, and not after the grain has been ground. The principal kinds are obtained from wheat raised in the lands, called *obi* or *ábi*, and of crops called *teremai*, which signify those raised from seed sown in the autumn and on irrigated land[1]. The flour obtained from this wheat is further classed as autmun or spring produce. Although as to general points the spring grain is the best, the natives consider the autumn wheat superior to it, and this because it leaves less refuse in the grinding, and takes less time to bake in bread-making. The quantity of refuse in the manufacture of the flour is approximately equal to from 10 to 14 lbs per *batmán* (*i.e.*, 10½ *puds*). The native millers do not recognise the close connection between the quality of their flour and the position of their grindstones, since they almost always fix them at one uniform height, and only perceive the necessity of getting more power out of them when they are crushing green corn. The flour is passed, by manual labour, through a fine or coarse sieve, according to the quality which may be required.

Owing to the imperfections of the native mills, and the considerable admixture with the wheaten flour of the grain of rank grasses, the outturn is often very inferior[2].

The flour furnished to the troops is thus frequently mixed by design, and for this purpose *sorghum* and maize[3] are freely used. Bread prepared from this mixture becomes dark in colour, and quickly gets stale. Apart from a designed adulteration, there are present in the flour particles of the rank grasses that grow so freely in all corn-fields. When these are added in any large quantities, the quality of the bread perceptibly deteriorates, and even at times a pernicious influence is thereby occasioned on the organism of man. Thus, in the year 1869, it happened at Sámarkand that whole bodies of men, after partaking of bread prepared from this kind of flour, complained of giddiness, whilst many of the number were actually sick.

Investigation showed that in the flour which had been used in the manufacture of the particular supply of bread, a grain called "Mastak" (*Lolium temulentum*), an intoxicating weed, was present in large quantities. The intoxicating effects of this herb are well known to the natives. It was likewise observed on more than one occasion that the bread when baked turned blue. This was first noticed at Perovski. Although this fact was unattended by any baneful results from the use of that particular bread as food, it clearly showed the admixture of some sort of plant which science had not hitherto discovered.

---

[1] Most interesting information under this head will be found on pages 285 *et seq.*, Vol. I, of Mr. E. Schuyler's Turkistán, one of the most valuable works, I venture to say, relating to Central Asia in English or any other language.—*Trans.*

[2] Russian Turkistán, No. 3 for 1872, pages 31-32.—*Author.*

[3] Natives can detect the presence of maize in the flour in the following manner: After pressure in the palm of the hand, flour that is so mixed retains its original appearance, and does not form into small balls, as is the case with pure, wheaten flour. Besides which, flour adulterated with maize has a sweetish taste, and is also very white.—*Author.*

The biscuits made by the Russian troops in Turkistán of native flour are of two kinds, those dried in the sun, and those baked in the oven. The former kind is generally consumed during the severe summer heat, ten days' supply being prepared at a time. Pieces of dough are simply placed on the grass huts, or on the roofs of houses, to dry in the sun. In two days' time the process is completed. Biscuits dried in this fashion are, however, inferior to those prepared in the oven: they have not the same intumescense which the latter have, and moreover they go bad sooner on the march. These causes have induced the troops to have recourse to sun-dried biscuits on frequent occasions. The percentage of waste in oven-baked biscuits admits of the preparation of 5½ *puds* of biscuits from one *chetverík*[1] of flour.

CHAPTER II.

Cotton Cultivation.

Importance of the Cotton Industry of Central Asia—Culture of the cotton plant—Harvesting of the cotton crops—Prices of the pods—Methods for removing the filament from the pods—*Chigrikh* apparatus—Clearing the filaments of husk—Prices of cotton wadding at the various points of Turkistán—Quality of Turkistán cotton spinning—Preparation of webs—*Biáz* (*máta*), *bujàn, susa* or *alátcha, Sansam, Kalyám, tampai, chit* (chintz or printed stuff)—Wearing apparel of cotton stuffs—Central Asian cotton trade with Russia—Defects of Central Asian cotton—Measures adopted or under consideration for the improvement of Central Asian cotton—Attempts at improving the culture of cotton throughout Turkistán—Necessity of importing cotton gins—Cotton pressing—Formation of a Russian Company for the study and extension of the Cotton Industry of Turkistán—Issue to the Turkistán troops of articles of local manufacture—Prices of the webs thus distributed—Yearly issues to the troops.

Cotton, and its preparation in various forms, comprises by far the widest branch of the manufactural industry of the races of Central Asia. This branch employs the largest number of hands, and it is at the same time the most prosperous article of trade with Russia.

In order to show what an important part cotton plays, as compared with other articles of produce, I append a table of the exports of the principal goods from Central Asia to Russia during the period embraced by the years 1858 and 1867.

The figures represent in each case thousands of *roubles*.

Name of Article.	1858.	1859.	1860.	1861.	1862.	1863.	1864.	1865.	1866.	1867.
Cotton . .	697[2]	486	713	536	1,864	2,933	6,583	3,494	4,032	5,513
Silk . .	69	94	82	150	156	52	46	36	146	1,273
Wool . .	91	65	87	62	68	114	180	120	266	252
Furriery . .	241	566	742	617	624	527	500	472	443	822
Leathers . .	928	729	753	685	781	584	687	643	467	500
Fruits . .	177	222	191	178	232	285	114	13	99	215
Cotton yarns .	113	58	37	135	74	53	112	233	83	196
Cotton materials .	697	756	655	759	566	699	418	424	331	534
Woollen materials	85	85	69	103	108	101	75	64	72	59
Cattle . .	3,162	4,100	3,953	4,301	3,961	3,491	2,826	3,207	3,110	2,946

---

[1] A *Chetverík* = 68 bushels.—*Trans.*

[2] By adding 000, and dividing by 8, in each case, the number of pounds sterling will be arrived at.—*Trans.*

From this table we see, too, that the cotton trade with Russia increases with each year. Bukhára has yielded and still yields the largest quantity of this article. Central Asia, as a whole, can now produce, without any great effort, 3,000,000 *puds* of raw cotton yearly. Of this quantity the quota of the Bukhárian possessions amounts to 2,000,000 *puds*, Khiva supplies 500,000 *puds*, and the rest is brought from Turkistán, and from the small Independent States lying along the central course of the Oxus.

Central Asia has everything in favour of cotton cultivation, *viz.*, a protracted and dry summer, no great amount of rain, and a good soil.

The cultivation of cotton in Turkistán is principally confined to the Fargána province, and to the Zarafshán circle, also, in a lesser degree, to the Khodjand and Kuráma districts of the province of the Sir-Daria, and, lastly, to the Turkistán district of the same province. Some years ago, near Fort No. 1 (Kázalinsk), a Kirghiz used to raise small crops, which brought him in a good return. The absence of a settled population (if we except the small body of Russian settlers in the forts along the Sir-Daria) on the lower course of the Sir, hinders the development of cotton cultivation in the Kázalinsk and Perovski districts of the province of the Sir-Daria. Cotton cultivation is being introduced on a small scale in the Kopál and Tokmák districts of the province of Semiraitchensk, and in it are engaged Kálmaks, Chinese emigrants [1], Sárts, and a few Russian settlers.

In the Kuljan region, as in the province of Semiraitchinsk, the growth of cotton can as yet only be regarded in the light of an experiment. In the former tract it is carried on by families of Sibo that form nomad camps along the left bank of the river Ili.

Cotton (*guza*) is grown as a spring crop. The ground for it is prepared as in the case of other sowings. In spring the soil is manured, and for this 100 *puds* per *tanap* is the allowance, or one *pud* for every 44 square feet. Instead of manure they sometimes simply renew the surface of the field by strewing it with from 30 to 40 cart-loads of earth taken from the roads, or from the ruins of demolished houses, &c.

The land is then ploughed over from four to ten times, it being supposed that the oftener the soil is turned the better will be the crop therefrom.

Sowing takes place in April; and from 30 to 40 lbs is the expenditure per *tanap*. Cotton seed (*chigit*) is sown in rows, the intervals between which are twice weeded before the plant begins to flower.

Cotton requires no great amount of irrigation; indeed, if the plant gets too much water, it grows too quickly and runs to stalk, whilst the pods will not ripen before the setting in of the frost.

In like manner, too, much drought is hurtful to the plant. The best sorts of cotton in America grow on islands or by the sea shore. The so-called Sea Island cotton is of this kind. In Turkistán the cotton plant is never watered more than two or three times; first just before the flower begins to form; for the second time when the pods appear; and for the third time as the pods begin to ripen. Ridges are raised between the plants, so that the roots of these alone may be wetted without the stem being covered.

If rain descends after the sowing is over, the ground is ploughed up and sown afresh because the first sowing is held to be destroyed.

---

[1] These, to the number of 100 families, came in the year 1866 and settled on the river Borohudzir, near the Russian frontier post.—*Author.*

The young shoots appear on the fifth, sixth, seventh, or, perhaps, even the eighth day after the sowing of the seed, and in a month's time they will have reached a height of about 7½ inches. The ground is then hoed over and the plants are weeded out, so that space of about 10½ inches may remain between each. The flower appears within two months of the date of sowing, the system of forcing or what may be called the hyper-culture of the plant with a view of increasing the crop, and of plucking off the head of each when it has reached a certain height, is not practised. But in America this pruning causes the plant to send out lateral spouts and thereby to increase the number of pod-bearing stems.

Cotton pods begin to ripen five months after the date of sowing, *i.e.*, in August; the harvest now begins. It should be observed that the ripening is by no means uniform, for whilst some pods have already ripened, others have only begun to form, and on one and the same field may be found pods ready for plucking and the rest with heads still flowering. According to the measure of their ripening, the pods crack and disclose the cotton filament which encloses the seed in each separate cell. The pods that have cracked are torn off the stems, stored up as fuel, or burnt upon the ground, and the harvesting is over by October.

The fortieth part of a *desyatína* at Táshkand yields 100 *puds* of cotton pods.

The *guza* (or cotton pods) are sorted; the green and unripe pods, as well as those that are, generally speaking, unfit for use, are thrown on one side; those selected are then classified. This operation requires a large number of hands and a good deal of time. Thus 14 pairs of hands working 12 hours will prepare a *batmán* (10½ *puds*). Women and children are generally put upon this kind of work.

From a *pud* of selected cotton pods the yield will be 10 lbs. of filament (*i.e.*, about one-fourth part of the whole material), 20 lbs. seed and 10 lbs. of empty pods. The price at Táshkand for a *pud* of raw cotton in pod varies from 80 *kopaikas* (2 shillings) to one *rouble* and 40 *kopaikas* (3*s*. 6*d*.), whilst the rate for picked or cleaned cotton is from 3 to 6½ *roubles* (7*s*. 6*d*. to 16*s*. 3*d*.).

Since then the fortieth part of a *desyatína* yields 100 *puds* of raw cotton in pod, the amount of cleaned cotton therefrom will be 25 *puds*, the seed weighing rather more than 50 *puds*. Consequently, the gross profits at Táshkand from a *desyatína* of ground under cotton will amount to 165 *roubles* (£20-12-6), at the rate of 6 *roubles* (15*s*.) for the cleaned cotton and 30 *kopaikas* (4½*d*.) for the seed per *pud*. Striking out from this amount the hire of work-people employed as above, and calculating that under this head 70 *roubles* (£8-15-0) per *desyatína* will be expended, the nett profits for the amount of ground specified will be about 95 *roubles* (£11-17-6) [1].

---

[1] Mons. Brodovski (in the Compendium of Russian Turkistán, No. 2, page 251) arrives at almost the same figures, for he therein says that a *tanap* of ground yields from 12 to 16 *puds* of *guza*, which, in other words, means that a *desyatína* yields 96 *puds*. M. Terentieff, on the other hand, is of opinion (*vide* his work entitled "Russia and England in strife for the markets") that a *desyatína* only yields from 48 to 60 *batmáns* of *guza*. According to this calculation, the nett profits from a *desyatína* under cotton would only amount to 35 *roubles* (£4-7-6), figures that are certainly below the mark. M. Khodja-Yunusoff says, moreover (*vide* issue No. 2 of the Turkistán Annual), that the gross returns from a *desyatína* under cotton cultivation amount to 336 *roubles* (£42), so that after allowing 71 *roubles* (£8-17-6) for the purchase of seed, and the pay of work-people, the nett profits would come to 256 *roubles* (£32).—*Author*.

The sorted cotton filament is cleared of seed by the aid of a peculiarly constructed wooden frame called *chigrikh* (*haládji*), the cost of which is 20 *kopaikas* (6*d.*) This frame consists of two rollers (about 14 inches long and 1 inch in diameter), which are fastened to the sides of the frame in a horizontal position and close to one another. By means of a handle one roller is made to revolve, and this, whilst in motion, by means of a spiral screw, causes the other roller to move the other way. The surface of each roller is notched, so that they may catch hold of the cotton filament more securely. A workman turns the roller with one hand, and with the other stuffs the raw cotton into the narrow space between the rollers whence the filament issues clear of seed. It is evident how imperfect is this apparatus for the cleaning of the cotton, and how, therefore, both crushed seeds and dirty cotton filament pass between the rollers and take away from its quality, more especially as bits of the husks of the pods likewise get mixed up with it. Apart from the imperfect cleansing with such a contrivance, its working is slow and wearisome, because with it, in the space of twelve hours, no workman can clean more than 2 lbs. of cotton.

Cotton seed is pressed for the oil which it contains. The average price of this cotton oil, which is called *pakhtamai*, is 30 *kopaikas* (4½*d.*) a *pud*. It is used as grease and for lighting purposes, and when mixed with *sesamum* oil is put into food.

After the cotton is cleared of seed it still has to be freed from particles of husk, dust, and other impurities. For this process it is spread out on a dried skin, the fur side of which is next the ground, and beaten with rods, or else strings of it are stretched and beaten out on a frame similar to the Russian apparatus for beating out wool. It need scarcely be added that the fur side of the skin, though placed below, acts as a receptacle for dust, which of course finds its way above, and mingles with the cotton which is being *cleaned!*

Central Asian cleaned cotton is known in Russia by the general name of Bukhárian cotton, although of course there are certain other distinctions in the material that comes from the several marts of Central Asia. Thus, genuine cotton from Bukhára is distinguishable by its greater softness, and by the whiteness of its filament; it is also cleaned with greater care than other kinds. Khivan cotton again may be recognised by the comparative length of the filament. Kokhand and Táshkand cotton are inferior to both the above kinds. The price per *pud* on the spot of cleaned Táshkand cotton (of the reddish and inferior kind) varies from 3 *roubles* to 6, or even 6½ *roubles* (7*s.* 6*d.* to 15 shillings or 16*s.* 3*d*). At Khokand cotton is from 50 *kopaikas* (1*s.* 3*d.*) to 1 *rouble* (2*s.* 6*d.*) cheaper than at Táshkand, whilst at Bukhára it is cheaper still (as much as 4 *roubles* or 10 shillings).

The Governor General of Turkistán, when visiting the Moscow Exhibition of 1872, begged the Imperial Society of Natural Sciences, Anthropology and Ethnography to prosecute researches as to the merits and demerits of Táshkand cotton, and also to indicate measures which it would be well to adopt as an aid to the development of the cotton industry in the territory under his charge. A Committee of experts was accordingly appointed by the Society; cotton from Turkistán was tested at the cotton mills of Messrs. Mamontoff Brothers, specimens of the tests being sent to the Polytechnic Exhibition. The Committee then gave in their report on the questions put before them.

This report was to the following effect. Táshkand cotton, and also that from Bukhára and Khiva, has, generally speaking, too short a filament, is brittle and too downy, is not silky enough, and lacks in strength and elasticity. That although these defects would limit the use to which such cotton could otherwise be put, and although the higher class of goods could not be manufactured therefrom, its other qualities made it quite possible to prepare from it good yarns of the lower numbers, inclusive of No. 20. It might even be possible to prepare from it the finer kinds, say, too, of No. 32, and perhaps No. 38; but in the preparation of these finer yarns much cotton would be lost, and the thread would be uneven and weak. The filament of Turkistán is not sufficiently uniform in respect of length and fineness, and, consequently, when spun is not of completely even surface. For yarns Nos. 30 to 40 certain other Asiatic cottons are better, for example, of Persian, Mazánderán and Surkh; of Indian or Surát, as their filament is closer and stronger, whilst in other respects they do not excel the cotton from Táshkand. But in comparing the various kinds of Asiatic cottons the one with the other, the general superiority must be given to Táshkand cotton, because from it can be made yarn of No. 20 thickness. The comparative weakness of its filament, and its consequent power of resistance, are not of much consequence in the preparation of the thicker kinds of yarn; but its brittleness and woolly texture, as likewise its colour and gloss, peculiarities of Táshkand cotton, constitute its decided merits[1]. Indeed, these merits are such as often lead to preference being given to it over Persian and Surát cottons. Thus, whilst Táshkand cotton has certain defects, it is a very useful raw product for Russian cotton-mills, not merely as an admixture with better descriptions of cotton but as furnishing material for its own manufacture.

Yarn is made from cotton filament that has been cleaned. The weaving is carried on by means of a small spinning-wheel called a *charkh*.

This spinning-wheel resembles an ordinary wide wheel without a tire, and its sides consist of separate and finely cut planks that project beyond the circumference of the wheel. These can, when necessary, be removed. Between the planks and in place of a tire cords are stretched in a zig-zag form, so that the projecting planks on each side of the wheel are fastened together. The wheel, which has a diameter of about 14 inches, lies with its fixed axle on the upper ends of two vertical posts that are fastened to two parallel scantlets. The wheel revolves between these posts with the aid of a handle. Into the two scantlets facing the wheel two cylinders are inserted. Through these and across the plane of the revolving wheel passes the spindle with a spout placed in its centre. Through this moves an endless cord encircling the wheel. This cord is attached to the zig-zag fastenings above described which act in place of the tire of the wheel. Since the axle of the wheel is parallel to the spindle, the two revolve in contrary directions, the thread being wound round the latter. With the aid of the spinner, who turns the wheel with one of his hands, the thread is assisted in the course of its winding on the spindle.

---

[1] The author has said above that these qualities are held to be defects rather than merits.—*Trans.*

In consequence of the bad quality of the cotton, its short filament, impurities, &c., the yarn frequently tears, and great unevenness of surface is the result. A pound of spun yarn at Táshkand costs, on an average, 40 *kopaikas* (1 shilling).

If the material required is to be coloured or striped the threads are coloured before the weaving takes place. The threads are boiled in a caldron containing the required colour in a state of solution. The colouring of spun yarn costs from 20 to 25 *kopaikas* (6*d.* to 7½*d.*) per pound and the name given to it is *kabút*. Almost all the native dyes are extracted from various plants, and, with the exception of madder, saffron, and indigo are unknown to European dyeing art.

The warp, whilst it is being prepared, is pegged on to a mud wall or on the ground, and is stretched out in a horizontal position. Whilst so placed the rows of threads are arranged, either with the fingers or with small sticks. After that it is taken to the weaver's press, which scarcely differs from that in use in any of our Russian villages.

Uncoloured yarn in Central Asia is prepared from a white web, called *biáz*, a sort of linen. In Russia the same material is called *máta*, from a long-established custom prevailing in Orenburgh of applying this name *biáz* [1] to a piece of goods and not to the fabric itself.

Biáz is made up in two widths, the narrow, or that which is 6⅛ inches wide, and the wide, *viz.*, of from 14 to 15¾ inches. The length of each piece is uniform, *viz.*, 14 yards. The former costs about 80 *kopaikas* (2 shillings), and the latter about one *rouble* (2*s.* 6*d.*) per piece.

Biáz is used as upper and under linen, the inferior kinds being reserved for the lining of *khalats*, for bag-making and tents, &c.

Of uncoloured yarns another sort of cotton material is prepared which is distinguished by its breadth. In this respect it is the *chef-d'œuvre* of Central-Asian weaving science.

Accordingly the particular web of which we speak occupies a place between Russian muslin and *marli* (?), but it more resembles the first of these. An inferior kind of the web in question is called *jangála*, and is used for the lining of *khalats*, and also for coverings and shrouds for the dead. It is made up in pieces, 21 inches wide and 7 yards long, the cost of which is 40 *kopaikas* (1 shilling). The better kind goes by the name of *dáka*, and is used in the making up of turbans. A piece of this, 42 inches wide and 9⅓ yards long, costs from 1 to 1⅕ *roubles* (2*s.* 6*d.* to 3 shillings).

Of coloured yarns they make in Central Asia various sorts of closely-woven and striped materials, something like Russian *sarpinka* [2]. These belong to the category of cotton webs and comprise *zendel* or *buyák*, a name given to closely-woven *máta* of a bluish colour. This material is made up in pieces, 10½ inches wide and from 9⅓ to 10 yards long, at a cost of 50 *kopaikas* (1*s.* 3*d.*). It is used to line *khalats*.

Susa, or *alátcha*, is a material with long stripes, in various colours on blue ground. It is sold in pieces, 10½ inches wide and 14 yards long. The cheapest kind sells at 60 *kopaikas* (1*s.* 6*d.*), that of medium quality at 1 *rouble* (2*s.* 6*d.*), and the best sort at 2 *roubles* (5*s.*) the piece. *Alátcha* is used in the manufacture of *khalats,* and for women's *shálbars* or trowsers.

---

[1] Mr. Schuyler says, page 189, Volume I, Turkistán, foot-note, that the Russians have corrupted the word *buz* into *biáz*.—*Trans.*

[2] A speciality of Sarepta, in the Province of Sarátoff.—*Trans.*

Sansam is the same sort of stuff as *alátcha,* from which it only differs in respect of the size of the pieces in which it is made up. Thus a piece of *Sansam* is from 19¼ inches to 21 inches wide and about 6 yards long, and costs 80 *kopaikas* (2*s.*) It is also used to make up into *khalats.*

Kalyám, or *pestriád,* is distinguished by its bright stripes on a white or pale-coloured ground. Pieces of this material are 10½ inches wide and 14 yards long, and cost 80 *kopaikas* (2*s.*). *Kalyám* is used for under-linen, trowsers, and also as a lining material.

Tampáya resembles *kalyám,* except that it is made up in wider but shorter pieces, which likewise cost 80 *kopaikas* (2*s.*) Káshgár is the chief producer of this sort of web, whence it is transported in every direction and also to Táshkand.

Besides the above-named Central-Asian webs, *chit,* or *vwiboika,* is made up in large quantities. The method of its preparation is as follows:

Raw *máta,* without any preliminary preparation, is washed and steeped in an alkali of *min-boom.* It is then wrinsed and laid out to dry. Then *buzguntch* [1] galls are taken, ground, and mixed in water, and in this the web is steeped. The material is once more wrinsed, dried and finally pressed. If black be the desired colour, old and rusty iron is used. This is dropped into a bitter solution of *shirish* (cherry gum), whence results an intensely bitter oxide of iron, and this is thickened with cherry gum. The printing of the material then proceeds. Flowers and patterns of a yellow colour are produced by the colouring matter derived from *tukhkhumyák* [2]. This dye is also thickened with cherry gum, or *shirish.* Material so coloured is further soaked in madder, and then placed in the sun.

Pieces of *chit,* or *vwiboika,* are about 10½ inches wide and 14 yards long. They cost 60 *kopaikas* (1*s.* 6*d.*). The most common sort of *vwiboika* in Central Asia has a rose-coloured ground (the result of not being able to extract from the madder a deep-red dye) with white and black rings printed on it. This kind is called *astar-chit,* and is used for the lining of *khalats.*

Another kind, called *kurpa-chit,* is used for coverlets and is distinguished by the more intricate design of the pattern and flowers thereon as well as by the size of the material.

Vwiboika, dyed only on one side, is called *ak-chit,* and is used for lining.

The coloured cotton webs of Central Asia are sometimes glazed, though of the chemical processes there is no knowledge in the country. The gloss is imparted by beating the material with a wide and flat wooden instrument called a *kudung.* It is evident that such a method of glossing, though capable of imparting some degree of lustre, impairs the durability of the stuff; indeed it may be said to altogether prevent its lasting. Hence the natives convey this gloss only to those materials for local uses. Those that they intend for export are never so treated lest the effects should wear off whilst the goods are in transit.

---

[1] Excrescences on the leaves of the pistachio tree which grows on the mountains near Táshkand.—*Author.*

[2] *Tukhkhumyák* is a dye prepared from the immatured flowers of a kind of bean, with which are freely mixed portions of the stalk and leaves. Previous to placing in cold water the article to be dyed, some of the infusion bearing this name is mixed with the water and this imparts to it a greenish-yellow colour.—*Author.*

Of the cotton materials of Central Asia it may be said generally that they are very coarse and exactly correspond with the hempen home-made webs of the villages of European Russia.

Little by little very fair specimens of cotton webs are finding their way to Central Asia from the centre of Russia, the manufacturers of which have long endeavoured to adapt themselves to and to satisfy the capricious taste and requirements of Central Asiatics. Russian chintzes made from Central-Asian cotton re-appear in Turkistán and throughout the country in a manufactured form.

Of the cotton fabrics of Central Asia are made articles of apparel such as under-linen, *khalats*, *tubeteikas*, or *tubetais* (or flat Báshkir caps), turbans and *kamarbands*, coverlets, horse coverings, or *jhuls*, kerchiefs, and the like.

A shirt at Táshkand costs 80 *kopaikas* (2*s*.) ; at Kokhand 50 *kopaikas* (1*s*. 3*d*.), whilst at Bukhára it is cheaper still. Trowsers are made from all sorts of striped stuffs, as well as from *biáz*. Their price at Táshkand is 50 *kopaikas* (1*s*. 3*d*.) and at Khokand 30 *kopaikas* (4*s*.½*d*.).

The poorer inhabitants of Turkistán wear *khalats* of native make. The prices of these are as follows: At Bukhára from 1½ to 2 *roubles* (3*s*. 9*d*. to 5*s*.) ; at Khiva from 80 *kopaikas* to 1⅕ *roubles* (2*s*. to 3*s*.) ; at Táshkand from 1 to 1⅖ *roubles* (2*s*. 6*d*. to 3*s*. 6*d*.). The richer natives of Central Asia wear *khalats* of Russian chintz, and under these will often place one made of *biáz*, or other native material. A *khalat* of Russian chintz at Táshkand will not cost less than 3 *roubles* (7*s*. 6*d*.). *Tubeteikas* (*kálaposhes*) are caps that just cover the surface of the shaven head. These, too, are often made of Russian chintz, as well as of various native silken stuffs. They are lined with *biáz*, and cost from 20 *kopaikas* to one *rouble* (6*d*. to 2*s*. 6*d*.), according to the quantity of silk embroidery thereon, and the quality of the material forming the groundwork.

Turbans are wrapped round the *tubeteika*, and constitute an article of pride and luxury to all true believers[1]. The poorer people wear turbans made of *dáka*, woven by themselves, whereas those of the more well-to-do folk are made of English muslin, manufactured either in India or at the mills of Manchester, Birmingham, and Glasgow.

Kamarbands, or girdles for fastening the *khalats*, are either locally prepared or are imported from Russia. The price of the former is about 40 *kopaikas* (1*s*.) ; those that are imported range much higher. Coverlets, as indicated above, are of a peculiar make. For these, several pieces of material are sewn together ; as a lining to these, bits of discarded material, either of cotton or even of camel's hair, unfit for anything else, are fastened on and the coverlet is ready.

The prices of coverlets at Táshkand range from 2½ to 4 *roubles* (6*s*. 3*d*. to 10*s*.) according to the size and quality of the web, and of its preparation in the loom.

Horse-coverings, or *jhuls*, made of cotton web bear two names, *yalpush*, or the piece used in covering the animal's head, with the object of affording protection from the sun; stuff bearing this designation costs from $1\frac{1}{5}$ to $1\frac{3}{5}$ *roubles* (3 to 4 shillings); and *kurpache*, or the material which is placed on the horse's back and loins. The price of this varies from $1\frac{3}{5}$ to $1\frac{4}{5}$ roubles (4*s*. to 4*s*. 6*d*.). Both are made of *chit*, or *vwiboika* (above described).

---

[1] The origin of the word for a turban (*chálma*) came from the fact that it was intended to constantly remind the faithful wearer of his death, and that the same material which he wrapped round his head in life would serve to enshroud his body after death.—*Author*.

The importance of Central Asia as a mart for the cotton manufactures of European Russia is immense. The Russian cotton industry occupies the foremost place in all branches of the country's trade, for the sum obtained in cotton cultivation and material thus received and manufactured equalled, during the year 1868, the sum of 46,654,000 *roubles*, or 14,581,750 pounds sterling.

There is no doubt that during the present year (1880), the above figures will be largely exceeded, and even now they do not suffice to indicate the dimensions of the cotton industry of European Russia. But on the other hand, so great an industry is thoroughly dependent on the supply to our mills of the raw material. This material reaches Russia from America, from India (in the form of the so-called Surât cotton), from Egypt, Persia, and also from Central Asia. Prior to the American war, the amount of raw cotton that reached Russia from the United States amounted to nearly 3,000,000 *puds*, whilst in the year 1871 the amount imported was 3,225,193 *puds*, valued at 48,025,715 *roubles* (£6,003,214-7-6)[1]. The quantity received of this amount through Asiatic Russia was 600,000 *puds*[2]. All the rest came through Europe, and with all such cotton Russia is supplied exclusively by England. The same supply is mainly derived by sending commissioners to the Liverpool market. Their commission, calculated at the rate of 2 per cent., amounts to the large sum of 960,514 *roubles* (£120,064-5-0). If to this we add freight and loss by exchange, and the fact that the

---

[1] In order to show the relative export of cotton from the various countries, I append the following table:—

Years.	Cotton Exported.					
	From Central Asia.		From Persia.		From America.	
	Thousands of *puds*.	Value in thousands of *roubles* and in English Currency.	Thousands of *puds*.	Value in thousands of *roubles* and in English Currency.	Thousands of *puds*.	Value in thousands of *roubles* and in English Currency.
1862	341	1,864 £233,000	63	316 £395,000	444	5,186 £648,250
1863	387	2,993 £374,125	107	785 £98,125	587	9,637 £1,204,625
1864	464	6,583 £822,850	240	2,603 £325,375	933	22,636 £2,829,500
1865	312	3,494 £436,750	154	1,166 £145,750	1,124	16,869 £2,108,625
1866	333	4,032 £504,000	247	1,764 £220,500	2,372	35,584 £4,448,000
1867	548	5,513 £689,125	214	1,235 £154,375	2,536	38,040 £4,755,000

N. B.—The figures 000 should be added to those representing *roubles* in each case.—*Trans.*

[2] On the Orenburgh Railway the amount of cotton carried in 1877 was 547,253 *puds*; in 1878, 593,231 *puds*, of which 47,807 *puds* were pressed. It should be observed that of late years almost all the cotton from Central Asia has come to Russia by way of Orenburgh.—*Author.*

supply of cotton is influenced by various political events, it will be seen more clearly how unfavourable for Russia are the conditions of the trade in American cotton. The dependent position which Russia occupies causes the most important branch of her manufacturing industry to be completely in the hands of England. Hence it is greatly to be desired that it may be found possible to alter all this, and to free her mills so that they may receive their supply of raw material by a less hazardous and expensive route. The wished for possibility lies in the direction of Russia's Asiatic frontier, hence the cotton trade with her Central-Asian possessions, and with the Khánates adjacent thereto, is deserving of the fullest attention and solicitude, with a view to the improvement of the quality and the increasing of the quantity of the raw material so received.

During the cotton crisis of 1864 Central Asia more than once rendered a service to the Russian cotton industry; it behoves us therefore to place our new source of supply in such a condition that it may always be able to satisfy the requirements of our cotton manufacturing industry. And this step is the more necessary, seeing that Central Asia is the sole market whereby we can hope to place our cotton manufactures in competition with those of England, and perhaps cause our supply of chintzes to excel those of our competitor. As cotton is the principal article of our import trade with Central Asia, so, too, does it regulate the demand for our manufactured goods, since in the case of native consumers almost the sole way of making payments is by tendering their own produce in exchange. Hence, the larger the amount of Central-Asian cotton taken by Russian cotton merchants, the greater will be the sale or barter of Russian wares generally. Moreover, Russia's demand for Central-Asian cotton involves a question of real importance in connection with the economic development of her Central-Asian possessions.

Meanwhile the bad qualities of the Central-Asian article lessen the demand on the part of Russian cotton weavers, and lead them to prefer what they have to pay more for, *viz.*, American and Indian produce. Of late Indian or Surát cotton is actively competing with our imports from Central Asia, and this because it is of better quality, is better cleaned, whilst its carriage by sea is more convenient.

The actual defects of the Central-Asian article—defects that debar its competition, not only with American, but also with Surát cotton—consist, *1stly*, in its shortness of staple, and its consequent unfitness, as we have seen above, for the manufacture of the finer numbers of yarn; *2ndly*, in its admixture with foreign bodies, which causes a great amount of loss of material whilst in process of manufacture.

The first defect is inherent in the plant brought under cultivation. American cotton has, on the other hand, a much softer and longer filament; the pods, too, of this plant open out wide, and force out their contents, so that no time is lost in the operation of separating the filament from the pod that envelopes it.

In view to encourage the importation into Turkistán of the better species of cotton plants, the Governor General, so far back as the year 1868, directed the issue, *gratis*, of supplies of American seed. This example was not without imitators, for in the year 1871-72 the firm of Raevski at Táshkand likewise issued, free of cost, 200 *puds* of imported seed. With several of those who took the seed the new sowings proved completely successful, so that it may be hoped that sooner or later Turkistán cotton, in respect of its filament, will no longer have to yield the palm to the American production. During the spring of 1871 a small experimental plantation was started at Sámarkand, and in this sowings were made of the best sort of American cotton (Sea-island). The objects in view were both to distribute amongst the native inhabitants the best quality of seed, and also to ascertain how the seed thrived when under a proper system of cultivation. Although it was the intention of the Governor General that the plantation just started should serve as the nursery of the better kinds of foreign cotton seed on fresh soil, it was not his wish to delay the issue of seed until the completion of the latest attempts at acclimatisation, and so, in the year following, 1873, 100 *puds* of Sea-island, Orleans, and other species of cotton seed were procured through the agency of the Finance Minister, and of the Russian Embassy in America.

The first sowings of the imported seed in the State plantation did not yield good results. M. Samolevski, who had been previously sent to America to study the cultivation of cotton, on arrival at Sámarkand inspected the plantation, and found that the failures attending the raising of American cotton seed from Sámarkand soil were due to the native treatment of this tender plant. M. Samolevski expresses his opinion in No. 50 of the *Turkistán Gazette* for 1876, that the cotton seed sown in this State plantation had been broadcast, and consequently that the plants came up too close together, so much so, indeed, that it was difficult to pass through the plantation; (each plant should occupy at least 1 foot of ground.) In consequence of this fault the plants had jostled each other, and had, therefore, gone almost entirely to stem, yielding but few pods. M. Samolevski was of opinion, too, that the experimental sowings had hardly been watered at all. Up to the year 1877 the Sámarkand State plantation was reserved entirely for the growth of cotton. It was subsequently decided to extend the experiments to the raising of other plants that play a great part in Central-Asian rural economy. This decision was based on the fact that, 1*stly*, cotton should not be raised from one and the same field for several years in succession (if it is, disease ensues, the plant is attacked by insects, and quickly degenerates); and 2*ndly*, that the inhabitants of the Zarafshán circle are interested in rice culture, also in raising wheat, *sorghum* (*jugára*), *kunjut* (or *sesamum*), more than in cotton cultivation. Zarafshán husbandmen represented, that with them cotton costs 2½ *roubles* (6*s*. 3*d*.) per *pud*, though there were occasions when its price fell to 1½ (3*s*. 9*d*.). Constantly, to use their expression, it did not pay to raise cotton for sale, and so they confined its production to their own domestic wants. Throughout the entire Zarafshán circle the amount of cotton raised amounts to approximately 160,000 *puds* of bolls.

Formerly, East Indian cotton was inferior to both Bukhárian and that grown in Turkistán; but now, in consequence of the distribution of American seed, it has already appeared as a dangerous competitor, and, thanks to the Suez Canal, made its appearance in the Odessa market in the year 1870.

The second defect of Central-Asian cotton which we have indicated above, *viz*., its dirty condition, arises from insufficient cleaning and bad packing. Central Asian cotton, as we have already shown, is cleaned in the most primitive fashion. The apparatus in use, besides involving delay, crushes the seed, and permits of the admixture of bits of husk and dried leaves, all of which give to the staple a dirty appearance. The filament thus badly cleaned is packed for export to Russia in huge bales weighing 8 *puds*. The material is loosely stuffed into sacks which form an unwieldy load, measuring some 7 feet long and about 4½ feet wide. Atmospheric changes, and the damp that is imparted in the passage of fords, damage the contents of such loads. Moreover, the covering, in passing by thorn bushes, or else by being rubbed in the strings of camels, gets torn, and the contents become exposed. In such cases the drivers, or any stray Kirghiz who may be met, do not fail to snatch some cotton from the sack replacing the same with a handful of stones, a piece of old cow-hair felt, or other useless article that may come in their way. In consequence of all this the Central-Asian cotton, when it does reach one of our Russian mills, has to be cleaned over again, a process which entails a useless expenditure that is often considerable, besides resulting not unfrequently in the reduction of the raw produce that has been purchased by 25 per cent. If to this we add the cost of the carriage of the refuse, calculated at 20 per cent., and if we consider that by the time the consignment reaches Moscow its carriage will amount to 2½ *roubles* (6*s*. 3*d*.) a *pud*, no less than 50 *kopaikas* (1*s*. 3*d*.) per *pud* will have fallen from the value of the material purchased. It is clear then that in such a state of affairs Central-Asian cotton cannot maintain a competition with the Surát or Indian raw material. In consequence of this latter description of cotton being clean and reduced in price (for the Suez Canal has cheapened its carriage direct from India to Odessa), the demand of our factories for this article now exceeds 1,000,000 *puds* per annum. These million *puds* are paid for in spare cash, or, at any rate, can only be partly paid for in kind, since of our manufactured cotton webs neither England nor India requires a single ell. The direct consequence of this fact must be a damaging upsetting of the equilibrium between our import and export trade. Besides which it has a baneful influence on our cotton fabrics. The limited demand for Central-Asian raw material lowers the purchasing power of those markets that would otherwise find a sale for Central-Asian products generally, the final result being that the Central-Asian markets are manipulated to the direct advantage of India and England[1].

With regard to the impurity of Central-Asian cotton, defects under this head are quite superficial, because it would be very easy to import gins and presses, and to exercise care in the packing of the material for export. With the introduction of proper cleaning apparatus, to be worked on the spot, and with the bringing into use of Russian presses to ensure the best system of packing for transportation, it may be hoped that the Central-Asian raw material will drive from Russian mills Surát cotton, the more so because the former has this decided advantage over the latter that the greater portion of it can be received in exchange for Russian chintzes.

The operation of cleaning cotton with a gin, to say nothing of the advantages of the process in regard to cotton-weaving generally, has one other decided superiority, for an enterprising individual—M. Brodovski[1] —gives figures showing the approximate amount of work that one gin will turn out during 100 days of a year. This account takes it for granted that the gin is worked by horse-power. If, therefore, water-power be substituted as a motor (and this is facilitated by local circumstances), the results would be still more satisfactory. M. Brodovski is of opinion that the gross profits from the working of a gin amount to 84 *roubles* (£10-10) *per diem,* or 8,400 *roubles* (£1,050) for 100 working days. Now, supposing that the cost of its erection, and the construction of a store-house for the raw material to be cleaned, amounts to 6,000 *roubles* (£750), and that the loss on the purchase of 16,000 *roubles* (£2,000) worth of raw material amounts to 10 per cent., we must deduct 1,600 *roubles* (£200). We must then deduct, say 15 per cent. for the repair and oiling of the machinery; this will be 900 *roubles* (£112-10-0). Cost of workmen and supervision must then be put down at 20 *roubles* (£2-10-0) *per diem,* or 2,000 *roubles* (£250) for 100 working days. The total expenditure for 100 working days will then be found to amount to 4,500 *roubles* (£562-10-0). Deducting this sum from the gross profits above noted, the balance is 3,900 *roubles* (£487-10-0) of net profit, a sum which exceeds 50 per cent. of the original outlay.

---

[1] Brodovski's printed lecture about the cotton plant, 1876, page 23.—*Author.*

For the placing of the cotton industry of Central Asia on a new basis, so to speak, the firm of J. Yánoff and Co. was established in 1876, with a capital of 300,000 *roubles* (£37,500). This Company had for its object the introduction into Turkistán and the adjacent Khánates of Khiva and Bukhára mechanical appliances for the cleansing of raw cotton, the crushing of the seed for oil and *Jmikhi* (?) and the distribution throughout Central Asia of the best species of the cotton plant. The same Company likewise intended to erect a mill for cotton-cleaning and for oil-crushing, and to start cotton plantations, first of all in the neighbourhood of Táshkand, and afterwards in other parts of Central Asia. To this end orders were sent to America for cleaning machines and presses, with a view to improving the process of preparing the Central-Asian raw material. Land was taken up in the village of Kuiluk, near Táshkand, and sowings of cotton seed were begun; but the Company being ill-adapted for the work they had undertaken speedily collapsed.

The cotton industry of Turkistán has a vast importance, not merely for the mills of European Russia, but for the Russian settlers in Turkistán, as well as for the troops therein stationed.

In the year 1869 specimens were sealed in the Head Office of the Turkistán Intendance Department of all articles of local manufacture, which, in the interests of the State, could be served out to the troops and to the hospitals in lieu of similar articles hitherto sent for the purpose from European Russia. This collection comprised many articles prepared from cotton, wool, and leather, as well as metal wares for hospital use, made by local craftsmen, according to orders and patterns given to them.

A Technical Committee, appointed by the Head Office of the Turkistán Intendance, after carrying out experiments with the articles submitted to them, and after going into the particulars put before them regarding the cost of each, and after a discussion as to the expediency or otherwise of serving the articles in question to the troops, came to the conclusion that though many of the cotton webs were very much inferior in point of durability to similar articles made from flax, yet, on account of their comparative cheapness, and of the possibility of curtailing, if thought expedient, a large number of items of issue, the change of the nature in view might be carried out.

---

[1] *Vide* the same brochure.—*Author.*

The recommendation likewise applied to metallic wares of local manufacture, but the issue of such was made subject to instructions from the Head Office of the Turkistán Intendance. With regard to woollen articles, not one was held to be fit for issue. Of specimens of socks, however, white and red in colour, it was thought it might be possible to make use of the former kind, provided they could be turned out of softer texture.

All regulations under this head received Imperial sanction, and were notified in Military Department Order No. 15 of $\frac{\text{21st January}}{\text{2nd February}}$ 1870.

Cotton webs came, therefore, into the category of articles issued to the troops in Turkistán.

At present the Turkistán troops have in use six sorts of cotton webs, and three sorts of *biáz* webs, in place of (*a*) Imperial Officers' hospital quality, (*b*) soldiers' shirting, and (*c*) stuff for lining; also striped *kalyám*[1] in place of hospital dimity or ticking: a thick web called *Korjún biáz,* in lieu of the rough material in use in Russia.

The contract prices of the cotton webs issued to the troops were as follows :—

Issue of 1870-71—

Biáz in lieu of shirting . .	. 8¼	*kopaikas*	(about 2½ *d.*)	per ell.
Biáz in lieu of lining material .	. 7	„	(about 2*d.*)	„
Kalyám in lieu of ticking .	. 8	„	(about 2¾*d.*)	„
Korjún–biáz . . .	. 20	„	(about 6*d.*)	„

Issue of 1871-72—

Biáz in lieu of officers' web .	. 8	*kopaikas*	(about 2¾*d.*)	per ell.
Biáz in lieu of shirting . .	. 8¼	„	(about 2½*d.*)	„
Biáz in lieu of lining material .	. 7	„	(about 2*d.*)	„
Kalyám in lieu of dimity .	. 8	„	(about 2¾*d.*)	„
Kalyám in lieu of ticking .	. 7	„	(about 2*d.*)	„
Korjún-biáz	. 20	„	(about 6*d.*)	„

Quantity of material furnished in 1871—

Biáz in lieu of shirting . .	. 272,121 ells,	at a cost of	21,770	*roubles.*
Biáz in lieu of lining . .	. 308,880 ells,	„	21,622	„
Kalyám in lieu of ticking .	. 412 ells,	„	29	„
Korjún-biáz	. 1,268 ells,	„	254	„
TOTAL	. 582,681 ells.,	at a cost of	43,673	*roubles* (£5,459-2-6.

The supply of cotton webs to the Turkistán troops increases yearly.

---

[1] Cotton web dyed with one coloured stripe on a white ground.—*Trans.*

CHAPTER III.

Sericulture in the Turkistán District—Origin and development of sericulture in Central Asia—Yearly amount of silk produced by the natives in Central Asia generally, and in the Turkistán District in particular—Cultivation of the mulberry tree—Different kinds of mulberry cultivated by the natives—Diseases peculiar to the Central-Asian mulberry—Methods of rearing the silk-worms—Different kinds of silk-worms—Eggs and their prices—Periods of breeding silkworms—Winding the cocoons—Fecundity of the moths—Different diseases to which the silkworm is subject in Central Asia—Prohibition against the export of eggs from Central Asia—Drying the cocoons—Price of the cocoons—Silk-spinning in Central Asia—Defects in the native method of spinning silk—Transfer of the silk from the large to the small bobbin—Manufacture of the yarn—Different kinds of silk in Central Asia, and their relative value—Working pay—Attempt of Russian traders to study and extend sericulture in Turkistán—Russian system of silk spinning—Causes of the failure experienced by Russian silk spinners—Efforts of the Administration to improve local silk—School of sericulture established at Táshkand—Importance of Central Asian sericulture in respect of Russian State economy.

The productions of silk and cotton form the two principal sources of wealth in the Russian Central Asian dominions.

Central Asia supplies Russia with raw silk and cotton in very considerable quantities, and this goes to the several manufactories to be converted into material, part of which finds its way back as an export to Central Asia.

In view of the importance of silk to our Russian industries, we will occupy ourselves now with a review of its production in Central Asia, being guided in our description by Mons. N. Th. Petrovski's excellent pamphlet, this gentleman having specially studied this subject on the spot[1].

Sericulture in Central Asia has long been known, and was most probably introduced by the Chinese, whose dominions in the first and second centuries B. C. extended to the Caspian Sea. But as an art, sericulture soon died away in Central Asia, and has only been renewed in comparatively recent times. In the Khánate of Bukhára it was revived by the enlightened ruler, Shámrád Beg, celebrated in the chronicles of Central Asia, who, in the year 1250 of the Hijra (1785), having subjugated the hitherto independent dominion of Merv, took by storm its capital city, and led into captivity all the inhabitants who remained alive, about 12,000 men, and settled them throughout the Khánate. It was these Mervites who revived the art of sericulture in Great Bukhára.

Oral tradition, current among the inhabitants of the province of Fargána, tells us that silk culture was introduced into the Fargána valley from the city of Khokand in times beyond the memory of man.

No other reliable information relative to the history of silk culture in Central Asia exists.

Silk industry is confined exclusively to the settled population, *i.e.*, to the dwellers in cities and hamlets who go by the name of Sárts. The inhabitants of Bukhára, and of the neighbouring towns and villages, are chiefly occupied in this industry. Next to them come the people of the province of Fargána; then follow those of the province of Sámarkand, of the Khivan *oasis*, of the Kárshi and Shahr-i-Sabz regions, and of the Hissár tract. In Eastern Turkistán sericulture is met with to a small extent in Káshgár, to a somewhat greater extent in Yárkand, and is very considerably developed in Khotán. As the northern limit of regular silk cultivation in

---

[1] "Sericulture and silk-spinning in Central Asia:" St. Petersburgh, 1874.—*Author.*

Turkistán, we may take the Fargána, Chatkál, and Kuráma ranges, which skirt the Fargána valley to the north. Beyond this limit northward, and towards Táshkand, Chimkand, and as far as Turkistán (the village Kornak), although sericulture is met with, yet it cannot be counted as an industry. In the Kulja region it does not as yet exist, but the mulberry tree is cultivated[1].

As to the amount of silk produced in Central Asia, it is extremely difficult to define it even approximately.

Judging from returns received from time to time of the amount of raw silk exported from the Central-Asian dominions to European Russia, Persia, and India, and supposing that the quantity exported equals one-tenth of the amount remaining in the country, it may be estimated that Bukhára produces 60,000 *puds* (2,160,000 lbs.) of silk. The figures as regards Khiva and Káshgária are still more conjectural, but for all that it may be presumed that in the former as much as 3,000 *puds* are obtained, and in the latter 10,000 *puds* (360,000 lbs.).

Since one *pud* (36 lbs.) of silk is obtained by the natives from 8 or 10 *puds* of dry cocoons, and one *pud* of dry cocoons comes from 4 *puds* of raw cocoons, it appears that Bukhára produces about 2,160,000 *puds* (77,760,000 lbs.) of raw cocoons; Khiva, 108,000 *puds* (4,248,000 lbs.); and Káshgária 360,000 *puds* (12,960,000 lbs.). Consequently these three independent States together produce 2,628,000 *puds*, or 94,608,000 lbs. of raw cocoons. In Turkistán, the silk industry is confined principally to the newly annexed province of Fargána, which till 1876 was known as the Khánate of Khokand. Silk is now produced to the amount of 50,000 *puds* (1,800,000 lbs.) or 1,800,000 *puds* (64,800,000 lbs.) of raw cocoons.

The Zarafshán province (with the Kátta-Kurgán and Panjkand sections) produces 10,000 *puds* (360,000 lbs.); the Táshkand region, 3,000 *puds* (108,000 lbs.); the Chimkand and Turkistán regions (including the city of Karnak near Turkistán, noted for its cocoons) 2,000 *puds*, (72,000 lbs.) Consequently Turkistán produces 1,826,000 *puds*

---

[1] In the year 1876 some attempts at silk cultivation in the town of Kulja were made by two students of the Vairnoye Government Gardens under the guidance of Professor Shtshegloff, who had studied sericulture in the Táshkand School. The journal of observations, and of the temperature at which the worms were reared, kept by M. Shtshegloff, was forwarded to the Director of the above-named school, for the purpose of scientific investigation, as well as the produce of the silk cultivation, *viz.*, cocoons, waste (*Sarnak*), to the amount of 4 lbs., and silk to the amount of 1½ lbs. We do not think it superfluous to give some details of the conduct of these experiments.

In 1876, 1 lb. 3 oz of silkworm spawn were fertilized, from which about 6 *puds* (216 lbs.) of raw cocoons were produced. Of this, 3 lbs. were selected for spawn for the year 1877. From 1 lb. of raw cocoons 495 bolls of silk were taken. From 3 lbs. 1,897 moths were bred, and these laid 8 oz. of eggs. After drying the 216 lbs. weight of raw cocoons, 66 lbs. remained, from which 10½ lbs. of silk were wound. Mulberry leaves for feeding the worms were given in sufficient quantities. The worms received food for the space of 43 days; winding the cocoons lasted 12 days. The small amount of silk received, relatively to the seed fertilized, must be attributed to the great prevalence of a disease amongst the worms called "yellows" and also to their weak condition, which, it is probable, was due to the amount of rain that fell in the summer of 1875, during which mulberry leaves were not unfrequently given to the worms while in a damp condition. The greatest number of the worms were of the Khojand and Sámarkand species. On the other hand, the Arabian species appeared hardy, and there was no mortality amongst them; for this reason the spawn of the latter was reserved for breeding silk-moths.

The winding of the silk was carried out on four stands by Tarántchi boys, on payment, under the supervision of the silk-worm breeder; but other natives also assisted.—*Author.*

(65,796,000 lbs.) of raw cocoons. If we add to this sum the amount of cocoons produced in the independent States, 2,628,000 *puds* (94,608,000 lbs.), we shall have the large total for the whole of Central Asia of 4,454,000 *puds* (160,344,000 lbs.) of raw cocoons.

Central Asia is renowned for its fertility in respect of mulberry trees, of which there are more than suffices for the requirements of the silk industry. There are indeed certain localities wherein the different kinds of mulberry exceed in quantity all other growths, as, for example, in the Khánates of Khiva and Bukhára, the Zarafshán circle and the province of Fargána, the small plots of fields and kitchen-gardens, the roads and courtyards are planted with mulberry in the form of a ground-fence, and sometimes this tree is also met with in gardens. The mulberry is pretty often met with in Upper Zarafshán, in the Khojand and Kuráma regions, and even in Táshkand itself, also in Chimkánd and Turkistán, where (especially in the towns) the people do not occupy themselves with silk cultivation, nevertheless here too the mulberry tree is still not unfrequently met with.

The wide distribution of the mulberry tree throughout Turkistán is explained by the fact that this tree serves Asiatics not only as food for their silkworms, but also as ornaments to their gardens, likewise for shade, whilst the berry of the tree furnishes them with food.

There are many varieties of the mulberry, but, unfortunately, they have not yet been defined scientifically. The natives themselves distinguish the following:—

(1) *Khassak-Tut,* or wild mulberry cultivated from seed, and which serves as a graft for all the other kinds.

This tree is not remarkable for its size, but it has long interlacing branches, and large fibrous leaves rough to the touch. Of this species there are several varieties; for example in Táshkand they recognize two, *viz.*, (*a*) the *katlama,* with whitish berries and large round seeds, and (*b*) the *bedána,* or seedless mulberry, bearing small yellow berries which soon fall and are not eatable.

In Sámarkand also two varieties of the *Khassak-Tut* are known, *viz.*, (*a*) the *Khassak-Bárgi-Kalián* (*i. e.*, the Khassak, with large leaves), and (*b*) the *Khassak-Bárgi-Maida* (*i.e.*, the Khassak with fine leaves.) Generally speaking, this species is preferred for feeding silk-worms.

(2) *Bálkhi,* the largest and handsomest species of all, which receives its name from the city of Bálkh, whence it was propagated. Its branches spread much, and its leaves are lustrous and thick like those of the lime tree. Its large white berries, almost seedless, are used as food both in the ripe and dried state. The dried berries are sometimes ground. The flour so formed when mixed with water makes the refreshing drink called *Ardáb*. If wheat flour be then mixed with this a particular sort of pie is formed, called by the natives *Tut-Halwa* or *Tut-Talkán*.

(3) *Sháh-Tut,* the royal mulberry introduced from Persia. This tree is of moderate height, with overhanging branches and with very large dark-green leaves rough to the touch. The berries are long, dark-red or almost black in colour, and are used as food, ripe and when dried, and in the latter case as a sudorific. The dark-coloured berries are used for dyeing thread blue: in order to obtain a blue colour a decoction of indigo is mixed with

mulberries steeped in slaked lime. The colour is ready after three days' preparation.

(4) *Marwáridak,* meaning pearls. A rather lofty tree with widely spreading branches, without lateral shoots, and with fine leaves. Its berries are white, sweet, and juicy, with a scarcely perceptible seed stone.

Of all the above-mentioned species of mulberry in Central Asia, the most widely distributed are the *Khassak* and the *Bálkhi,* after which follows the *Sháh-Tut,* the *Marwáridak* being much more rarely met with. The price of young trees is not generally high: from 3 to 4 *kopaikas* (¾*d.* to 1¼*d.*). Grown trees are from 20 to 40 *kopaikas* (6*d.* to 1*s.*) each.

The *Khassak,* as has been said, is produced from seed, the remaining species being grafted on it. Propagation by budding the several species, one on the other, is not practised.

The ground for mulberry cultivation is prepared in the same way as all kitchen-garden or *hayát* land, that is, in the spring they manure, plough, and harrow it, dig it over with the *ketmen* (a wooden hoe, to one end of which a round edge is fastened at right angles), surround the plantation with an earthen bank, and then inundate it. The sowing of the mulberry usually takes place in May, and never later than June, when the berries ripen. About this time they collect the berries which have ripened and fallen to the ground, and rub them in the hands with sand or ashes, in order to remove the seed from the pulps; they then scatter the former on moist ground, which, after the sowing, is ploughed up. This method is adopted especially with the more extensive sowings. When the young mulberries are not fenced round, or are not transplanted, they are cut like grass as food for the worms.

Another method of sowing or rather of planting the mulberry is in rows. For this they dig shallow furrows with the *ketmen* or hoe along or across the land ploughed up for sowing. Into these they put the mulberry seeds, 10½ inches apart, and cover them with earth. Sometimes they vary this method in a very original manner. They take some marshy plant, roll it in twisted cloths, and in the bruised stems they place the mulberry seed, and then bury the whole in the furrows which have been dug.

The first sprouts of the mulberries soon appear, *viz.,* about eight days after the sowing. They are about as close together as the sprouts of wheat. As soon as ever the young sprouts appear, the ground is inundated with water for some hours: after this the inundations take place every ten days, or even oftener, according to the dryness of the ground. In the course of one year the mulberry-tree, under favourable conditions, attains a height of 4 feet 8 inches, with the thickness of the little finger at the root. By the spring of the second year after sowing, they either cut it as food for the worms, or fence it round where it stands, or else plant it out in permanent places, such as gardens, along ploughed fields, fences, canals, &c. The practice of fencing the young trees is followed most of all, that of cutting them down least often; indeed, this practice is only met with in some villages of the Khánate of Bukhára or of the province of Fargána, where the leaves are not plucked as food for the silk-worms. After the *Khassak-Tut* is either dug round, or planted out as seedlings in the sort of places above described, that is to say, in the second or third year of its growth, the grafting of other species on the young stems is commenced. In the third or fourth year the berries make their appearance on the new graft. The *Khassak-Tut*, a species which is reserved for silk-worms' food, is not grafted, as the natives have observed that this species in its normal condition lives much longer than the grafted varieties. Moreover, the silk-worm appears to prefer its leaves to those of the grafted kinds.

The grafting takes place in the spring, *i.e.*, in the month of May. The operation goes by the name of *dudka* or *fleita* (piping or fluting) (*naicha paiwand*)[1].

This method, as carried out, consists in slitting two, three, or more branches of the wild species, and stripping the ends, so treated, of their bark for about an inch. To the bared ends is then attached a piece of bark, containing a bud of the species to be engrafted, of the same size and diameter as that of the wild stem. The graft is secured by means of a splice to the branch of the parent stem. The grafted place is then carefully wrapped up and plastered over.

Of diseases peculiar to the Central-Asian mulberry, two are very common, *viz.*, (*a*) *Kára-uzyák*, or black core, and *Shakarak*, or honey-dew. *Kára-uzyák* appears between the thirtieth and fortieth day of the mulberry's first appearance. All the core, from the root to the ends of the branches, becomes black; the sapling then rots, the leaves shrink, and the tree perishes. According to the natives this disease originates from excessive watering of the roots.

Shakarak is a disease common to almost all the trees and shrubs of Central Asia. It generally appears in May or June, when the leaves, and sometimes the stalk and branches, give out a slimy saccharine fluid, which is only injurious to the tree when the discharge is excessive, and this is very rarely the case.

Having reviewed the different varieties of the mulberry tree, let us turn to a consideration of the methods of rearing the silk-worms.

The rearing of silk-worms in Central Asia is generally the occupation of the women; the leaves for the food of the worms are daily brought on asses from the gardens, or carried therefrom by boys, or the younger members of a family. A family consisting of four men can easily collect about 100 lbs. of raw cocoons, the money value of which would amount to 30 *roubles* (£3-15-0) *per annum.*

The silk-worms of Central Asia have been produced from a cross with so many different varieties that it is now impossible to trace them to an original type. Being so heterogeneous the natives obtain from them cocoons of the most varied form and colour. Amongst the several varieties two kinds are specially noticeable, *viz.*, (*a*) the ordinary (of a milky colour before the winding of the cocoons), and (*b*) the Arabian, which is of a yellow colour. Generally speaking, the Central-Asian cocoons are not considered good; eggs taken from them and exported have proved unfit for reeling, whilst the silk spun from them in Italy has turned out of a very inferior quality. Nevertheless, one cannot altogether condemn the Central-Asian cocoons, since it is possible, by means of extended experiments and labour, to restore their original type, and this will, in all probability, insure a better description of silk.

---

[1] Another sort of grafting is known to the natives as *prishtshep* (slitting) or *iskána paiwand*), and is used generally in the case of fruit trees.—*Author.*

The silk-worms' eggs are kept by the natives in cotton bags, which are hung from the ceilings of their dwellings. These are sold in the bazaar in the spring, before the reeling of the worms, but only in those places where silk culture is particularly developed; where this is slack the sale and purchase of the eggs is carried on in the houses. One thimble-full, containing about a sixth of an ounce (one *miskál*) of spawn, costs in the bazaar from 10 to 30 *kopaikas* (3*d.* to 4½*d.*); one such measure contains generally about two thousand or more eggs. Their good quality is tested by throwing them into water: those that sink are good.

At the end of March, or the beginning of April (old style), that is, when the leaves appear on the mulberry trees, women empty the spawn of the silk-worms into small bags made of some cotton material, and carry them in their bosoms and under their arm-pits. Such a method of hatching can hardly be considered satisfactory, as the eggs become dull, and are thereby deprived of fresh air, which to them is most essential. The worms are not hatched all at once, but gradually, and begin to appear within about a week of the time of their first being exposed to the warmth of a human body.

Every day the bags are opened, and the worms that are hatched are placed on a flat dish (*savát*), tray or basket, covered with a clean cloth. They are then placed in the sun, and covered over with a sieve to preserve them from its rays. If the days, and especially the nights, are very cold, the dish with the silk-worms is placed on a *mangal*, or wide stool, over a pit dug in the middle of the room, and filled with heated embers. This pit with charcoal, as has been already remarked, takes the place of an oven in Central-Asian dwellings.

The Central Asian silk-worm has, according to the species, four or five periods of development in its existence. The first of these is the chrysalis stage. The interval between the hatching of the silk-worm and its first change amounts to seven days. Silk-worms feed on the first day of being hatched, mulberry buds finely cut up being scattered over them. On the second day they are given leaves of the same tree, and these are thrown to them three times a day. On the expiration of these seven days the silk-worms sleep for the first time, and remain asleep from two to three days. In order to protect them from insects (ants and different sorts of vermin), the dishes containing them are generally placed on small stools, the edges of which are wrapped round with wadding, or else the dishes are placed in baskets, or under gauze, and hung from the ceiling.

The second period of development of the silk-worms lasts from seven to nine days. During this time leaves only are stripped off for them. Their cells are now enlarged, and the silk-worms are put out on mulberry leaves placed on larger dishes or flat baskets. Their stands are changed, and generally more attention is paid to them than before. Their sleep after this stage lasts as long as on the first occasion.

The length of the third period is likewise from seven to nine days. The silk-worms are removed to shelves made of split reeds (or *chit*, grass), arranged along the walls and in the centre of the hut.

They now begin to feed the worms with leaves adhering to the twigs, and this food is served out three times a day. Still the leaves only are eaten, for the silk-worms do not touch the twigs until they are large enough to be moved to a new stand.

Generally speaking, the gnawed twigs and small branches are left, and the silkworms, by crawling from the lower twigs on to the upper, save the natives the labour of cleaning the stands. The sleep of the silkworms in this period also lasts about three days.

The fourth period has no defined limit: it terminates with the spinning of the cocoon, the length of this period depending on the quantity of the food taken in: the more abundant the food the sooner the silkworms commence their work. Before the spinning takes place a small broom of the white poplar, or, better still, of a plant called the *min-básh*, or thousand heads (*Convolvulus sp.*), is inserted in between the heap of gnawed twigs and branches. The silk-worms crawl on to this, and discharge a web from their mouths, winding it over the different twigs. When a sufficiently firm foundation has been laid they begin to envelope themselves in a wide spiral web. Each successive layer of the spiral becomes closer and closer, the cocoon is less visible, and at last all motion ceases: the work of the cocoon is now finished.

The life of the silk-worm, from its issue from the egg to the spinning the cocoon, depends on weather, locality, food, and the species in question; but it averages from forty to seventy days.

When the spinning is over the twigs, with the cocoons, are taken outside and the best cocoons are selected for breeding. Those picked out are called *Jaigardáb*, or those with a *moiré* appearance, because their upper surfaces should then look as though they were covered with wavy flowers. No attention is paid to their colour; but they ought to be firm, elastic at their ends, of regular form, not too thick or too slender, but small in the middle. Cocoons very slender in the middle contain, the natives think, the grub of a male caterpillar.

The cocoons selected for breeding are strung in groups of from 20 to 30 on a thread, which is carefully passed, by means of a needle, under the upper folds of the cocoon. They are then placed in muslin bags, which are hung by long nails driven into the walls or into the ceiling of the house. After about seven days the grub caterpillars bite their way out through the cocoon, the moths then creep out through the opening thus made, and they are hardly dry before they rip off their covering, in doing which they display remarkable energy. Coupling takes place from 9 o'clock in the morning till mid-day; the laying the eggs is accomplished between 3 o'clock in the afternoon and midnight. The moth then dies. Her whole existence is but for one day and a half, during which she lays some 450 eggs, and of these one-fourth are infertile.

In the Caucasus the moths live about three days, and lay as many as 600 eggs.

As soon as the process of laying is over, the eggs are collected in bags, and suspended from the ceilings of the dwelling-houses.

Central-Asian silkworms, like those in Europe, are subject to various diseases, which sometimes cause great ravages amongst them. The natives have noticed the following :—

(1) *Zira*, which shows itself in the early growth of the silk-worm. Its appearance is marked by the fact that the worm attacked by it changes from a dark colour to white, becomes shrivelled and dies. According to

native statement, this disease results from cold weather and from neglect in allowing the bright light of the sun to fall on the silk-worm. This disease, however, is one of the least importance.

(2) *Sufed-marg* (a Tájik expression signifying the white death) or *Akma* (an Uzbak word meaning dropsy). This disease appears in the second period of development. Its appearance is detected chiefly by the sleeplessness of the worm, by its beginning to swell, becoming unusually thick, and being full of a yellowish fluid. The silkworm takes no nourishment, clings by its hind feet to the twigs placed for food, hangs with its head down, and having emitted all the fluid from its body dries up. The causes of this disease are not known.

(3) *Buk-zard* (a Tájik word), or *Sarimcha* or *Sarín*, which in the Uzbak tongue signifies the *yellows*. This disease appears in the third stage, and sometimes in the fourth. It also shows itself by the worm not sleeping, crawling about perpetually, turning yellow, and after two days dying, emitting the while a fetid fluid that may be communicated to the other silk-worms. In the opinion of M. Medvaidyeff, this disease arises from wet leaves given to the worms after rain or dew.

(4) *Kárásan.* The name of this disease comes from the colour of the silk-worm, which becomes covered with black spots. This disease is considered one of the most fatal, as it generally appears in the last stage of the silkworm's growth, at the time of spinning the cocoons, and is very infectious. The silk-worm attacked by it soon becomes quite black, the upper portion of its body adheres to a leaf and rots, emitting, as in the "yellows," a putrid fluid infectious to the other silk-worms. The cause of the disease is explained by the presence of putrid food, and by want of cleanliness in the care of the worms.

Microscopic examination of the eggs of Central-Asian silkworms has detected in them the presence of *Cornelia*, or the corpuscles causing the disease which in Europe is called *Pebrine*. These investigations were conducted by the late M. Fedchenko, who came to the conclusion that the animalculæ *Cornelia*, in small quantities, do not spread infection, and do not engender an epidemic; that the multiplication of the parasites, and the contamination by them of a whole batch of worms, and consequent mortality amongst them, were directly affected by the number bred in a certain locality, and by the care or otherwise taken of them. In Europe, as is known, the animalculæ *Cornelia* cause frightful epidemics among silkworms,—epidemics which do not at present occur in Central Asia.

In the hope of obtaining healthy spawn, many Italian and fewer French silk-worm breeders have tried to get to Central Asia in order to purchase it.

Foreigners appeared for the first time in Bukhára on this account in 1863[1], and afterwards in 1869-70, after the annexation of the Turkistán district by Russia.

But as a great demand for eggs might prejudicially influence Central Asian sericulture, and as the natives so employed might become careless in their treatment of the worms, and as an epidemic might, through want of care and cleanliness, result, with a view to the preservation of this industry, foreign agents were in 1870 prohibited from exporting from Turkistán more than 4,000 lbs. of spawn, and afterwards the export of grubs was altogether forbidden by the Governor General of Turkistán.

---

[1] In the year 1863 three Italian silk-worm breeders arrived at Bukhára with the design of purchasing silk-worm spawn: but they were imprisoned, deprived of all their goods, and were only saved from death by the energetic action of the Russian Government and of the trader Khludoff.—*Author.*

This regulation finally received Imperial sanction, and was confirmed on the $\frac{27\text{th April}}{9\text{th May}}$ 1871 by the Ministerial Council.

Cocoons intended for silk-reeling are placed for about three days on cow-hair felt and hurdles, which are spread on the roofs of the houses. At night they are raked together in a heap and covered over. When day returns they are again spread out, but too great an exposure to the sun kills and dries up the caterpillar.

After moderate drying in the sun the weight of the cocoons is reduced one-fourth, so that only 1 lb. of dried cocoons is obtained from 4 ℔s. of raw.

If the cocoons are dried by steam 1lb. of dry is obtained from 3½ ℔s. of raw. The experiment of drying the cocoons by steam was made by M. Medvaidyeff at Khojand. According to this gentleman, the cocoons so dried give more silk, the threads are unwound more regularly, and the silk obtained is more glossy, and quite without harshness, whereas the sun-dried cocoons open slowly, require very hot water, are difficult to wind, and leave much waste.

This circumstance M. Medvaidyeff explains by the fact that when the caterpillar is dried in the sun it becomes, so to speak, baked, and the fluid emitted is either absorbed by the cocoon, or coagulates in the felt, and thus adds to the labour of unwinding and reeling the silk. From 40 lbs. of steam-dried cocoons M. Medvaidyeff obtained 11 ℔s. of silk, the refuse only amounting to 2 ℔s. From 36 ℔s. of sun-dried cocoons 4 ℔s. of refuse cocoons were discarded; the remainder gave only 5½ ℔s. silk.

Thus the steam-dried process was more than double as profitable as the sun-dried.

The dried cocoons are sold at from 40 to 50 *roubles* (£5 to £6-5) per *pud*. The raw may be bought wholesale for 8 *roubles* (£1), but the bazaar price of the same goes up to 12 *roubles* (£1-10).

As regards the amount of profit made by the natives in the silk industry, it is difficult to make an estimate, since they do not concern themselves with such questions and keep no accounts. The following approximate estimate may, however, be made. In order to obtain 36 ℔s. of cocoons, ⅓ oz. (or a thimble-full of spawn), or ½ ℔. of raw cocoons must be bought. Then, for the silk-worms' food, about eight middling-sized mulberry trees are necessary, at the rate of four trees to ⅙ oz. of spawn. The cost of the spawn will be 60 *kopaikas* (1*s*. 6*d*.), that of the mulberry trees about 5 *roubles* (12*s*. 6*d*.). The making of the stands will not cost more than 40 *kopaikas* (1*s*.), so that the whole outlay will be 6 *roubles* (15*s*.). If trees have not to be bought, and if the silk-worms are confined to the breeder's own garden, which is mostly the case, then the necessary expenditure will not exceed 1 *rouble* (2*s*. 6*d*.). Even putting the average price of a cocoon down at 9 *roubles* (£1-2-6), the breeder will still make a profit of 8 *roubles* (£1), so that the occupation may reasonably be considered to be advantageous

Silk-spinning in Central Asia stands at the lowest stage of development, for the reason that, with the natives, it does not constitute their sole occupation, or one on which they are wholly dependent for their subsistence. They, in fact, only take it up occasionally or when so inclined, devoting hardly any capital to it. A native, indeed, resorts to it just as light-heartedly as he throws it up when it appears to him in any way unprofitable.

When they spin silk the natives have not its export in view, but only the supply of simple local requirements, and they therefore never trouble themselves about any methods for improving the apparatus which they use. They work where they live: in a mud-plastered hut, under an earthen shed, in the midst of dust, which is perfectly amazing; amidst smoke and filth; on shapeless stands by the side of a smoky hearth, whereat hisses a kettle of fetid, filthy water brought from the street canal (*arik*). The silk-winding takes place only in the summer, for the winter is cold and raw, firewood is dear, and there are no ovens in the houses. For all these reasons it is difficult to hope that the native silk industry can be quickly improved. For this it would be necessary to change the whole course of native life. For the development of this industry in Turkistán the construction of European silk-reeling factories would possibly have a beneficial influence. Such factories need not be on a large scale, but under owners well versed in the wants of the European market.

The native method of spinning silk is as follows: On a mud hearth of irregular cubical form, standing about 3½ feet from the ground, and surrounded by fuel, which is piled up to the roof itself, is a rather large cast-iron caldron (*kazán*), in which the steaming and unwinding of the cocoons are carried on. Over the caldron are placed, in a sloping position, two trestles, about 28 inches long, and in shape like a ladder. These trestles are of wood, and of about the thickness of a man's arm. They are close to each other, and taper towards their upper ends. To these trestles are fixed transverse wooden fastenings or rungs. From the middle of these fastenings an iron wire, like a hook, is suspended in a horizontal position over the caldron. This hook has a loop at the end, which is called the eye-hole. The upper ends of the ladder-shaped trestles are fastened together by a cord, the middle of which is strengthened by a small, flat ball like a block, of the size of the finger nail. Over the front of the caldron, and almost touching the above-mentioned ladder, hangs by the cord a rather large platter which serves to screen the face of the silk-winder from the spray of the boiling water in the caldron. With the same object the upper part of the ladder, for half its length, is covered with leather.

At the distance of about 6 feet from the hearth, and on the same side as the above-mentioned trestles, two props, about 3½ feet high, are fixed vertically in the ground. Between these, and resting on their upper ends, a wheel, 4½ feet in diameter, revolves in the plane of the above-mentioned ladders, motion being given to it by a handle. In order to fix this wheel in a lower position a small trench, about 7 inches deep, is cut in the ground under it, and in such a way that the rim of the wheel may, when in revolution, find space within this trench. Between the hearth and the wheel, and on a level therewith, two thin wooden props, about 7 inches high, are fixed in the ground. Into these an iron axle is let, and to one end of this axle, and on the outside of one of these props, a wooden spool is attached, whilst to the centre of the axle, and midway between the props, is fixed an endless screw, which catches the wheel on the surface of its grooved rim. As the wheel revolves by hand, motion is imparted, by means of the endless screw, to the axle and the spool affixed thereto. The two parts above described, *viz.*, the hearth or upper part, and the lower or the wheel and its belongings, comprise in its entirety a native silk-spinning stand[1].

The silk-reeling itself is conducted in the following manner. Water from the *arik* (canal) is set to boil in a caldron, and when it is at the boiling point the cocoons are thrown in. The workman (*usta-pilyakásh*) sits at the hearth near the caldron in such a manner that the small ladder shall be on his right. He then provides himself with a crooked stick (*chupsa*), with which he stirs and churns up the cocoons which have been dropped into the water. The action of the stick causes the disintegration of the cocoons, so that the fibre and ends of silk become detached and adhere to the stick with which they are being stirred. The former is thrown on one side; the latter are placed in the left hand, and when a sufficient quantity has been thus secured the ends are joined, passed through the hook (*gajak*) and block above described, and handed over to be wound to the workman sitting by the wheel. The latter now winds the end of the thread on the spindle, which is attached to the axle, sets the wheel and axle in motion, and so the thread is wound. When the thread taken from the cocoons becomes thin, a new supply is fastened to the spindle. In this manner the spinning is continued until the whole of the cocoons in the caldron are spun out. More fuel is then thrown on to the smouldering hearth, the water is changed, and fresh cocoons are poured into the caldron.

From 15 to 20 rolls of silk are generally unwound from a cocoon.

A native silk-winder works for a week of 5½ days: from Saturday morning till Thursday evening, *i.e.*, till 4 or 5 o'clock, the hour of the *Namáz-i-digar*[2]. It is impossible, however, to define the number of working hours in a day, as, owing to the patriarchal relations existing between master and workman, no sort of supervision is exercised over the latter, and he works, as the saying is, just as he pleases. The master is himself absent almost all the time, and the workman or workmen in their turn prefer to occupy themselves in conversation with the passers-by, or in gazing into the street, &c., &c.

There being no possibility of defining the number of working hours, it is also difficult to estimate how much is wound from one stand in the course of a day. The natives say that with good labour a silk-spinning stand should wind in a day 3 lbs of silk, with moderate labour 2 lbs, and with very bad but 1½ lbs.

These figures appear high, but it should be remembered that each skein of native silk contains but 20 or more threads, and consequently its weight cannot serve for a comparison between the labour of native silk-reeling and that which is applied in Europe.

---

[1] Petrovski, "Sericulture and silk-reeling in Central Asia:" St. Petersburgh, 1874, pages 99-101.—*Author.*

[2] The second time of prayer.—*Trans.*

Besides this, native silk-winding, through negligence and want of supervision of the work of the winders, proceeds at a more rapid rate than amongst European winders.

Strictly speaking, indeed, the natives produce not silk, but a damp filament of silk, much resembling that which is obtained from the cocoa-nut, and which is sold at a low price in all maritime towns.

At Táshkand, with native winding, one *pud* of silk is obtained from 9 *puds* of good, or from 11½ *puds* of bad, cocoons. In Sámarkand the outcome of the same method of reeling is considerably more profitable, for there one *pud* of silk is obtained from 6¾ *puds* of dry cocoons [1].

The silk thread which comes out of the caldron and passes through the eye-hole (or *gajak*) and block of the trestle which hangs overhead is wound by the action of the wheel on to a large spindle (*máshpára*) or substitute for the reel in use in European stands. This spindle will hold 1½ lbs. of silk.

With the above the first stage, so to speak, of Central-Asian silk-winding ceases. The second stage begins with the transfer of the silk from the large spindles to the small (*naicha*), with a view to its ultimate winding on a stand of peculiar construction.

For this operation either the wheel of the silk-reeling stand is used, or the wheel (or *charkh*) that is used in cotton or wool-spinning is brought into play. The unwound portion of the cocoon bears, amongst the natives, different names, thus, the upper portion of the fibre of the cocoon, which, as said above, adheres to the hooked stick (or *chupsa*) which is used to fish out the ends of the silken thread, is called (*purka*); the gnawed parts of the cocoon that come to pieces in the water and also the best portions of the *purka* go by the name of *sarnak;* and the inner part of the cocoon, the actual wrapper of the chrysalis excepted, is called *kázina*, under which name they include all spun flakes, in the same way that by the name *sarnak* they understand all the remains of the unwound cocoons which is not made up into thread.

Sarnak goes to Russia in considerable quantities, and is made use of locally, being worked up into thread or galloon for embroidery, tassels, &c.

For the manufacture of thread the *sarnak* is pulled to pieces by hand, or with a particular instrument resembling a curry-comb; it is then spun in the same way as cotton, on a spinning wheel (or *charkh*).

Sarnak is sold at Táshkand for from 15 to 40 *roubles* (£1-17-6 to £5) per *pud*, according to its degree of cleanliness.

The silk which passes from the caldron to the spindle (of the large or small kind it matters not), that which goes too from the silk-winding wheel to the spinning wheel, or that which is to be sent for dyeing, all bear the name of *Kaliyáva*. By native silk-winders this sort of silk is very seldom spun, and when it is the cocoons whence it comes are always marked as bad. Besides that set apart for home consumption, *Kaliyáva* finds its way abroad both to Russia and to India. The best sort of *Kaliyáva* is that from Námángán, which sometimes fetches as much as 133 *roubles* (£16-12-6) per *pud*, with six months' credit, and 125 *roubles* (£15) for ready money. Next in order of merit comes the *Kaliyáva* of

---

[1] With European silk-reeling from 180 lbs., or even 145 lbs. of cocoons, the out-turn would be 36 lbs of silk.—*Author.*

Khokand and of Khojand; each kind sells at the rate of from 102 to 127 *roubles* (£12-15-0 to £19-5-0) per *pud.*

The silk transferred from the large spindles to the small, and which is then spun into skeins on reels, bears in the trade the name of *Khomyák* (*Homyák*). This kind is prepared exclusively for export to Russia, and costs at Táshkand from 159 to 190 *roubles* (from £19-17-6 to £23-15-0) per *pud.*

The silk prepared with crossed threads is called *takhfil,* and costs from 178 to 212 *roubles* (from £22-5-0 to £26-10-0) per *pud.*

In Bukhára, besides the *Kaliyáva* and *Takhfil,* the exported silks are of three kinds, *viz.*, *Gul,* a sort of *Khomyák, Tchillya* warp, and *Pucha,* a silk with a fine thin thread.

The best kinds of *Gul* come from the colony of Báshir, lying on the banks of the Amu-Daria above Charjui, and celebrated also for the manufacture of its carpets. The Bukhárian kinds of silk are sent to Russia through Kázalinsk (Fort No. 1).

The silk skeins are subjected to washing: they are then dipped several times in alkali (*ishkár*), and rinsed and again washed in cold water. After this they are immersed in a decoction of fungi, known under the name of *gushna,* and again rinsed out in water.

Working pay is given to each workman according to the amount of silk that comes out of the silk-reeling caldron. In Sámarkand and Bukhára the pay of all the different workmen, who take part in the silk-winding, is alike. In Táshkand and Khokand such too is the case. In Táshkand for a pound of silk the payment is 25 *kopaikas* (about 7½*d.*); in Khokand for a *tchaksa*[1] (=10 pounds of silk) the payment is 5 *khokands.*

According to the calculations of M. Petrovski, one *pud* of silk from the time it leaves the caldron till the preparation of the warp costs in Táshkand 10 *roubles* (£1-5-0), in Sámarkand 16 *roubles* (£2), in Khokand 20 *roubles* (£2-10-0), and in Bukhára 30 *roubles* (£3-15-0). The average of these rates would be 20 *roubles* and 70 *kopaikas* (£2-11-9) per *pud* of silk. Calculating this payment by time, and taking 2 lbs. as the highest daily rate, and 1½ lb. as the lowest, it appears that in the first case, regard being had to the locality, a silk-winder receives on an average from 1½ *roubles* (3*s.* 9*d.*) to 50 *kopaikas* (1*s.* 3*d.*), and in the second case, from 40 *kopaikas* (1*s.*) to 1 *rouble* 15 *kopaikas* (2*s.* 10½*d.*) a day, besides food. With such a rate of pay it is easily understood how the Russian silk-weavers, who have to pay their workmen from 10 to 12 *roubles* (£1-5-0 to £1-10-0) a month, without food, have never had good workmen, but have to put up with boys hardly acquainted with their work, in whose instruction much time as well as silk is wasted[2].

On the formation of the Turkistán circle, Russian adventurers hastened to engage in sericulture, in the expectation of acquiring enormous profits. Between the years 1867 and 1872, inclusive, eight more or less solidly constituted silk-weaving firms were established in Russian Turkistán, but all of them failed very soon after being opened. Thus it was that the following silk-weaving factories were opened and closed:—

---

[1] Schuyler says on page 201, Vol. I of his Turkistán, that a *tchaksa* is divided into 200 *paisas,* each of which weighs ¾oz. The same author, on page 203 of the same volume, tells us that the real value of a *khokand* is 16¾ *kopaikas*=5½*d.*—*Trans.*

[2] "Sericulture and Silk-reeling in Central Asia," pages 118-19.—*Author.*

(*a*) At Khojand, those of Messrs. Khludoff and Zuyeff and the silk-weaving company of Moscow traders.

(*b*) At Táshkand, those of Messrs. Pervushin, Michaeloff and Gurde, Messrs. Rayevski and M. Faddaiyevitch. Besides this, silk-reeling has occupied for a more or less long period the attention of the following lady and gentlemen, who have likewise failed therein: Madame Fisher, and Messrs. Deunett, Khoja-Yunusoff at Táshkand; Mr. Pokrishkin at Khojand; and Mr. Rayevski at Sámarkand. So unfortunate a termination of the silk industry is to be attributed to several causes.

The Turkistán tract, like all little explored and distant countries, appeared to the imagination of speculators a magic mine of wealth, into which one had only to thrust the hand to become rich. In the hope of great gains speculations were entered into, and expenses of such a kind incurred as would not in other cases have resulted. The establishment of the Russians in a recently-settled country, whilst destroying former economic conditions, produced a considerable rise in the price of all local products, of raw material, of labour, of means of transport, &c. Thus for instance a *pud* (36 lbs) of cocoons came to be sold at the Russian factories not merely for 28 *roubles* (£3-10-0), but for 40, 45, and 48 *roubles* (£5, £5-12-6, and £6, respectively).

Another cause of the ill-success of silk-reeling in Turkistán was that persons who undertook it not only were not well acquainted with its local conditions and peculiarities, but had only a theoretical knowledge thereof, for they had had no previous opportunity of engaging in it.

Lastly, there was still another circumstance which also contributed to the failure of Russian silk-reeling factories in Turkistán.

It has been remarked above that in 1870 permission existed for the export from Central Asia up to 4,000 lbs of silk-worm eggs. In consequence of this traders rushed into a speculation for their purchase, and so silk-reeling was neglected, no stores of cocoons were made, and no proper account was kept of the produce.

All the above-mentioned causes resulted in the appearance of silk-reeling factories in the new district, and amongst those that were closed were some which had received pecuniary aid from the Russian Government.

These failures should not, however, deter Russian speculators in their endeavours to engage in the Central-Asian silk industry, since the Russian Government will continue to aid private individuals whose energies are thus directed. A few years ago a school of sericulture, with laboratory attached, was established in Táshkand. This school has for its object, *1stly*, acquirement of the original type of silk-worm from amongst the different existing species; *2ndly*, the improvement of this by means of selection; and *3rdly*, the acclimatization in, or rather the introduction into, Turkistán, of the Japanese species. And besides these, another object will be attained, *viz.*, the instruction of the natives in the best method of silk-reeling.

In establishing the school spoken of, the local Government has in view the public advantage, for a private individual cannot afford the cost of a business that will not bring him personally any profit [1]. The public chest alone can continue experiments in the hope of gain in the more or less distant future.

The school of sericulture referred to was established at Táshkand in 1871, and its direction was entrusted to M. Oshánin.

Central-Asian silk-rearing is a matter of the greatest importance to Russian political economy, and has indeed reached a point that cannot fail to engage the serious attention of the Government. It is a trade which is possessed of all the conditions necessary for a wide development. Even when left to itself it has progressed with remarkable rapidity. Thus, prior to 1867, the imports of silk into Russia from Central Asia were insignificant, and during the period from 1856 to 1866 their value fluctuated between 36,000 and 156,000 *roubles* (*i.e.*, from £4,500 to £19,500); on an average their weight amounted to about 950 *puds* (34,200 lbs or 77 tons) yearly.

In 1867, 7,822 *puds* (281,592 lbs, or 700 tons) were received, at a value of 1,273,038 *roubles* (£159,128-15-0).

The closing of the Orenburg-Siberia custom-house in 1868 deprives us of data for estimating the amount of silk exported in subsequent years; but one may be convinced that the quantity increased by observing the larger exports of silk from the town of Táshkand, which may be called the capital of Turkistán.

CHAPTER IV.

WOOLLEN INDUSTRY.

Wool industry and its importance to the people—Quality of the wool—Sheep, goat, and camel-shearing—Prices of the wool—Spinning and dyeing of the yarn—Felt-making—Different kinds of felts (*koshmás*) and their prices—Supply of felts to the Turkistán troops—Question as to the preservation of woollen articles in the Commissariat stores—Manufacture of carpets and *paillasses*—Manufacture of camlets—Adaptation of this article by the troops—Felt hats, *kaps*, *korjúns*, lassos, nets.

The woollen industry of Turkistán, as of Central Asia generally, is the exclusive *métier* of the nomads. The domestic life and surroundings of these races favour such handicrafts. In fact, wherever we may happen to come across the *habitat* of the nomad, we shall everywhere meet with those products that his cattle-rearing enables him to supply. His portable abode (*yurta*, *yulameika*, or *kibitka*), his felts (or *koshmás*), spread upon the ground, and serving as a substitute for couches; the carpets and coverings that ornament his dwelling-place; his clothing (*armyáchina*) and felt hat; the bags for his utensils, and for fastening to his camels on the march; his ropes (*arkáns*) and his cords; his cattle-coverings and the like, are all made of wool.

The settled inhabitants of the country, as a general rule, get all their woollen articles from the nomads, but there are certain kinds of such material that they make for themselves, such as cloth, web spun from goats' hair, and so on.

Apart from the imperfect methods used in the preparation of all Central-Asian woollen goods, such articles are further depreciated by the bad quality of the original material. The Central-Asian races pay no kind of attention to increasing the fineness of the texture of their

---

[1] The Author has before spoken of the great profits to be made in the silk industry of Turkistán.—*Trans.*

fleeces. The sheep is washed imperfectly, if, indeed, at all. Before being shorn the animal is driven to the water, but the small desert streams scarcely permit of its back being covered; and besides this the slimy-brackish bed (the general characteristic of most Central-Asian water channels) so discolours the water above that instead of being cleaned the animals' wool is still more bedaubed. Of the sorting of their wools the nomads have no idea.

Most owners shear their sheep at two seasons of the year, *viz.*, in spring and autumn. The earlier shearing is carried on about the middle of May (old style). From the older sheep 2½ ℔s of wool is the average yield, and from the younger animals about 1 ℔ less. The first sort of wool is sold at Táshkand at about 1 *rouble* (2*s.* 6*d.*) a pound, and the second at over 30 *kopaikas* (9*d.*). The quantity obtained from the autumn shearing amounts to half of the spring crop.

Goats are sheared only once a year, in the spring, when about 1¼ ℔s of wool and ½ lb. of down is obtained. Goats' hair is not sold at all in the bazaar, but passes from hand to hand amongst the natives themselves, to be made up into the various articles which they hold to be luxuries, such as cords for hanging about on festal occasions or for use when moving camp, or small felts for the adornment of their *yurtas*, &c. The down is sold at 5 *roubles* (12*s.* 6*d.*) a pound in Russia, and also in the town of Ura-Tube, where a material for turbans is made from it.

Camels are sheared in June, when the wool is divided into two sorts. The first sort, from the back and flanks of the animal, is obtained in the quantity of about 8 ℔s and costs 5 *roubles* (12*s.* 6*d.*) per *pud.* This kind is used in the preparation of various webs. The second sort, from the neck and haunches, is a thick wool, and is obtained in the quantity of 4 ℔s The price of this is about 2 *roubles* (5*s.*) a *pud.* This kind is made up into thread for stitching cushions, &c.

The wool intended for web-making is rinsed out and soaked in hot water with soap or the root of lucerne grass (*jenushka*). It is then dried and laid on dressed leather or on skins, woolly side downwards, in layers of about a foot in depth. After this it is beaten out with a stick and carded.

The wool so treated is smoothed with the fingers, and then rolled up in a linen wrapper, from which the thread can be spun by holding the wrapper under the arm-pits and the spindle in the hand. The operation of spinning is carried on whilst the person so engaged is standing or walking.

The dyeing of the yarn, the preparation of the warp, and the weaving, is carried on in the manner described above in our sketch of the cotton industry.

The natives of Turkistán manufacture the following articles from wool:—

(1) *Koshmás*, or felts. They are made in the following manner. The wool, when washed and carded, is laid out evenly and sprinkled with water. The felt undergoing the process of manufacture lies on a reed mat, which is then rolled up into the shape of a tube. The ends of this tube are closed with strings, and it is then stamped on, rolled, and thrown about. This operation, or romping, having gone on for two hours, the mats are unrolled, and the imperfectly kneaded felt is taken out, again sprinkled with water, and then wound round a wooden roller, on which the kneading of the

felt is completed by blows with the elbow and by rolling. Girls are employed in this labour, and they are assisted by lads amidst an interchange of merry-making and shouting. Felts are of two kinds, plain (grey) and coloured. The best felts are the white. Those being made in Káshgár are known as *Káshgárian*. The prices of felts at Táshkand are as follows: white felts (Káshgárian), 14 feet long and 9 feet broad, 6 *roubles* (15*s*.); black or Kirghiz felts of the same size, 5 *roubles* (12*s*. 6*d*.); grey (also Kirghiz), 14 feet long and 6 feet broad, 4 *roubles* (10*s*.) Felts about 7 feet long and 3½ feet broad cost 60 *kopaikas* (1*s*. 6*d*.) Sárt felts[1] are cheaper, but their quality is decidedly inferior to the Kirghiz article. A Sárt felt, 16 feet long and 6 feet wide, costs 4 *roubles* (10*s*.) and one 9 feet by 6 feet, 2 *roubles* (5*s*.).

The troops of Russian Turkistán have likewise for a long time appreciated the use of native felts. They used to be issued to the Orenburgh detachments prior to the formation of the Turkistán circle, and when the Russian troops went to garrison this new territory several yards of felt were served out to them in the proportion of one *arshín* (28 inches) per man. During autumn, winter, and spring marches, and in the towns even in summer, the use of felts is particularly suitable. The troops use them to lie upon at night when in camp, and are protected from the damp that rises from the ground. Light, portable tents (*tentes d'abri*), also made of felts, preserve them on such occasions both from the sun and from rain and night dews.

Now-a-days when any large movement of troops takes place, the Turkistán Commissariat invariably serves out felts, in the proportion of one *arshín* (28 inches) to each man. The men spread these pieces out flat and lie on them, one beside the other.

Besides being used by the soldiers in lieu of beds, felts also serve as packing material for an artillery park when on the march, and also as wrapping for Commissariat stores. The very best felts for these purposes are obtained from old and disused Kirghiz *yurtas*. Felts of this kind are remarkable for the compactness and strength of their manufacture. But it is frequently necessary to buy new Sárt felts, which fulfil very badly the requirements of packing, because they are loosely put together, and therefore soon fray, and quickly become unserviceable; and since they readily absorb water, they considerably increase the weight of the load. This latter quality constitutes the great defect of felts generally, the more so as they take a long time to dry. Their preservation, too, in the summer is attended with inconvenience, in that moths are readily bred in them, and not only destroy the felts themselves, but spread from them to other woollen articles.

The Local Administration, being anxious to discover some means of preventing the injury to woollen articles caused by moths in the Commissariat stores, nominated a Committee of Experts at Táshkand in 1876 with the object of reporting thereon. This Committee, however, did not devise any more effective measures than those already in practice in the

---

[1] *Sárt-Kirghiz.*—Kirghiz felts are called in *Kazák, Kirghiz.* This description of woollen manufacture is called *Koshmá* by the Orenburgh, Ural, and Siberian Cossacks, who have long prized them. The Orenburgh Cossacks are even called in jest the *Koshemniks* (or felt people), on account of their excessive fancy for the *Koshmá* or felt. Before the Cossacks advanced from Orenburgh to the steppe, all the owners of these felts had to watch sharply lest they should be stolen.—*Author.*

Commissariat stores of European Russia, and of which the sprinkling the woollen articles with carbolic acid is considered the most effective.

(2) *Cloth.*—Fulleries, like those in use amongst the Russian peasantry, do not exist in Turkistán. It is needless to say that the native cloth is distinguished by an unusual coarseness. An inferior order of cloth is received from Russia, a country which only exports to Central Asia cloths of the most inferior and cheapest descriptions, costing not more than about one *rouble* (2*s.* 6*d.*) an *arshin* (28 inches), and not more than 3 *roubles* (7*s.* 6*d.*) per *arshin* if the cloth be coloured. The town of Ura-Tube is the most famous in Turkistán for its large cloth industry, and here a material is produced from goats' hair which is used in the manufacture of turbans. A piece of Ura-Tube cloth (42 feet in length) costs 5 *roubles* (12*s.* 6*d.*); Kirghiz cloth of the same size would be priced at 1½ *roubles* (3*s.* 9*d.*). A turban of goats' hair wool costs 10 *roubles* (£1-5).

(3) Carpets are made principally by the Turkománs. The village of Báshir, on the banks of the Amu-Daria, above Charjui[1] and within the Khánate of Bukhára is renowned for the manufacture of carpets. Turkomán and Báshir carpets are sold not only in Asia, but also in Europe. Clearness of colour, regularity of design, and durability of texture are the distinguishing qualities of these carpets. They are made exclusively by women, and the intelligence is remarkable with which these half-wild beings observe regularity, and devise patterns which rival in taste the most elaborate productions of Europe. Several women work at one carpet, under the superintendence of an old crone, who draws the pattern on the sand with a sharp-pointed stick, and then, as she gazes thereon, calls out the number and colour of the threads required for its design.

(4) *Paillasses* are long (and frequently wide as well), fine-striped carpets. Uzbaks of the Sári tribe make them in large quantities. This tribe nomadises to the south of the Zarafshán river, over the Kárshi steppe. Their carpets obtain a sale at Kárshi, whence they find their way all over Central Asia and even to Russia. The cost of the best kind of *paillasses* (of large size) is 25 *roubles* (£3-2-6); that of an ordinary one of small size is 8 *roubles* (£1).

(5) *Armyáchinas*, or camlets, called by the natives *Chakmáns*, are made of a thick web of camel's hair, resembling the woollen camlets used in Russia. They are of various colours, from dark cinnamon to a light maroon. The white kind from its so soon soiling is not much in use. A piece of *Armyáchina* (42 feet) of the best sort costs 5 *roubles* (12*s.* 6*d.*); a bit of inferior kind 3 *roubles* (7*s.* 6*d.*), and even less.

This sort of native material has been brought into extensive use amongst Russian troops, and particularly amongst the Cossacks. The white linen shirt, worn by the infantry soldier, is evidently ill-adapted to the Cossack, because its white colour is not suitable for the frequent outpost duty of this class of Russian soldier, and because of its becoming so soon soiled. Hence, in 1865, in view to establishing one pattern of dress for the Cossack soldier, a uniform of the material in question was ordered. All Cossacks were directed to wear one pattern of shirt with sloping collar and shoulder-straps. In other words, the *armyáchina* was to take the place of the ordinary linen shirt worn on parade.

Experience has proved the great suitability of *armyáchina* shirts.

---

[1] See page 46 of this volume.—*Trans.*

The quality of this particular material completely answers the daily and field requirements of a Cossack uniform. The *armyáchina* is durable, does not soil, protects the body excellently from the heat of the sun, and, although a little heavy, keeps out the dust and is scarcely penetrable by the wind. Such a shirt in constant wear will last from 2 to 2½ years. The sole defects of the *armyáchina* lie in its narrowness (from 8 to 10 inches), and in its soon going into holes at the elbow. But the above-named advantages completely atone for these two defects, the more so as the cheapness of an *armyáchina* renders them of still less account. Up till now, however, neither the colour nor the thickness of the material for Cossack shirting has been laid down. Consequently each individual soldier purchases shirts of a quality regulated by his means; the more well-to-do and the dandies sport *armyáchinas* of a fine dark-coloured texture, whereas the poorer soldier makes a shirt for himself out of a coarser and lighter-coloured material. *Armyáchina* shirts cost the Cossack soldier from 1¼ *roubles* (2*s.* 3½*d.*) to 2⅝ *roubles* (3*s.* 6*d.*) a piece. The majority of Cossacks only provide themselves with one such shirt, and this they do not wash probably because they perceive a resemblance between the material of an *armyáchina* and that of ordinary cloth.

Turkistán officers, when on the march, also wear campaigning shirts made from *armyáchina*. These are cut with oblique collars and have *epaulettes*. For long marches cotton and white linen shirts have many disadvantages for officers in that they are obliged to take very many of them, to change and wash them as often as possible, and with all this they do not afford any protection from dust, or from wind or damp, and this the *armyáchina* does. Besides which shirts of the materials in question soon get completely spoiled. Hence *armyáchina* as a material for a campaigning dress has been rapidly and universally adopted by Russian officers serving in Turkistán. Hence too has arisen, on the part of those possessed of the necessary means, a demand for the best kinds of *armyáchina* of Bukhárian manufacture. The closeness and neatness of this material and its fineness is quite remarkable, so that shirts made from it are not by any means lacking in beauty. The price of this kind of *armyáchina* is considerably higher than that of the ordinary sort, being 10 *roubles* (£1-5) per piece.

On occasions when a warm covering is required, as, for instance, in winter and autumn expeditions, the officers have shirts made of a downy material from Ura-Tube. These shirts cost about 3 *roubles* (7*s.* 6*d.*) a piece, have *epaulettes* attached, and they take the place of the ordinary shirt of the military gymnasium.

(6) Felt hats are made out of either sheep's wool or goat's hair. The former cost 40 *kopaikas* (1*s.*) a piece. Amongst the nomads felt hats take the place in summer of the three-cornered *malakhais*, or fur caps, which they wear during the winter.

(7) *Kaps*, or bags for packing all goods not liable to breakage. These also are made by the nomads out of thick *armyáchina*, and for these sheep's wool is principally used. In making them no attention whatever is paid to the colour of the wool employed, so that the colour of the material when woven is variegated. On account of its coarse properties this kind of *armyáchina* is woven very quickly, and therefore one workman, or rather workwoman, can make an *armyáchina* of 3 *bat-*

máns (7 to 8 feet), measuring 3½ feet, in three days; and this includes the sewing of it. *Armyáchinas* are sewn together with pieces of woollen thread. *Kaps* are made up in different sizes, according to their name, *viz.*, *batmán*, half and quarter *batmán*. The latter weights have appeared solely on the demand of Russian merchants, to whom they are indispensable when counting dry substances in *chétverts*. The sizes of each are as follows: A 4-*pud kap* contains 24 *cháriks*[1]; a 6-*pud* equals 36 *cháriks*; an 8-*pud kap* equals one-fourth of a *batmán*, which weighs 10½ *puds*. *Kaps* are made up, too, of 3 *batmáns'* weight.

The chief application of the *kap* in Turkistán is for carrying loads on baggage animals. For this purpose they are not to be replaced. Constantly trailing from the backs of camels or horses, with valuable stores of kinds in them, and exposed in the course of caravan journeys to all sorts of jolts, jostlings, and damage from rain and dust, a *kap* will still last for five years. The Russian troops have on several occasions recognised their suitability as a travelling-sack in their marches in the mountains and on the steppes, when all baggage has had to be carried either on horses or camels. On such occasions it is the 3-*batmán kap* that is used. A bag of this capacity is loaded with different articles, leaving the middle only lightly filled, so that in this part it may be so adjusted as to fold over when loaded on the animal's back. The *kap*, from its weight, adheres so closely to the pack-saddle that on a good road it requires no fastening. If, however, there should be many ascents and descents it needs to be secured with cords.

To load *kaps* on camels they are packed full, and fastened on in pairs on wooden ladders, which are first of all hung on to the *choma*, or camel pack-saddle. For any kind of grain like barley smaller *batmáns* (of the measure of a *chétvert*) are used, and in many cases, too, the *kap* of 6-*pud* capacity; but if donkey carriage be used, the 4-*pud kap* is the size chosen. When emptied of their contents during a march, *kaps* can, without the slightest inconvenience, be placed on the other loads. When so available they serve, too, as an excellent covering in bad weather.

Thus the *kap* as a material for transport purposes ought to be considered the most convenient of all receptacles. Linen bags do not last half as long. *Koshmás*, or felts, a material much in use in Central Asia for transport purposes, even when of the best quality and of high price, tear very quickly when so used, and they also considerably add to the weight of the loads. Their thickness, too, makes them unsuited as a wrapper for articles required on a march.

(9) *Korjúns*, or bags, whether made up as wallets or as nose-bags, are of the material called *armyáchina*. Amongst the Turkistán troops, these, like the *kapis*, have been in most general use by the Cossacks. A nose-bag of *armyáchina* costs from 15 to 20 *kopaikas* (from 4½*d.* to 6*d.*), and with the least care will last a year; but if the Cossack owner thoroughly dries the nose-bag after each feed of barley or wheat, and washes it occasionally, it will last for a considerably longer period. On the march the nose-bag is used to carry such articles as barley, biscuits, or the like, and, compared to linen, has this advantage, that it does not readily tear.

---

[1] The natives estimate weight by *cháriks*=⅙ *pud* (6 lbs.) in Táshkand, but greater weights by *batmáns*, which vary in different localities: thus at Táshkand, one *batmán* is equal to 10½ *puds* (378 lbs.), in Sámarkand to 8 *puds* (288 lbs.), but the number of *cháriks* to a *batmán*=64.—*Author.*

A *korjún* somewhat resembles a *kap*, with its ends stitched and open in the middle, or two bags with their mouths partially sewn up. The mouth of the *korjún* is threaded with a cord or lace, which draws its edges together. Closed in this way, it is thrown across the saddle, and found very convenient for loads, since, if any article be required, it is necessary to open one side of the *korjún* only. A *korjún* is light, capacious, lasts a long time, and costs from 30 to 40 *kopaikas* (from 9*d*. to 1*s*.). The above-described properties of the *korjún* render it, in the form of saddle-bags, a requisite for anyone who may want to transport anything on horseback. No single officer, still less a Cossack, can get on during a march without a *korjún*. Amongst the Cossacks, indeed, this article is not to be replaced even in time of peace. With it a man rides to the bazaar, or when he requires the smallest quantity of forage. The *korjún*, too, serves him as a receptacle for his bread or for his barley. On the march, again, he fills it with all his necessaries, such as his kettle, barley, bread, and spare horse-shoes; in a word, with all his goods and chattels. As the *korjún* cannot be conveniently fastened to the back of the saddle, because of its hanging too low and striking against the horse's flanks, the Cossack generally secures it to the saddle-bow, throwing the right end towards the left, and the left end towards the right. By this method of suspension the fastenings of the *korjún* itself are left available, and can be used to secure the great-coat or fur-jacket to the saddle-bow, whilst the *korjún* itself can be readily and at any time removed.

Besides the *korjúns* which we have just described as being made up from thick *armyáchina*, there are in the trade a whole series of others of various forms and patterns; from the very small kinds shaped like a double net, that are used sometimes by officers to carry bottles of liquor, to the elaborate ones made out of carpet material, costing as much as 6 *roubles* (15*s*.).

(9) Lassos (*arkáns*) are twisted out of horse-hair mixed with sheep's wool, or goat's or camel's hair. Lassos 35 feet long cost from 20 to 30 *kopaikas* (6*d*. to 9*d*.) each. Native lassos have obtained extensive use amongst Russian troops on account of their cheapness, and from their being always easily procurable in the bazaars of populated localities. But in point of strength, and suitability for packing, they are much inferior to the Russian hempen cords.

(10) *Chashm-Bandis* [1] are veils used to cover the faces of the women of Central Asia when they go out into the streets. They are made of plaited horse-hair, and cost about 3 *roubles* (7*s*. 6*d*.) a piece.

CHAPTER V.

LEATHER INDUSTRY.

Preparation of furs by the natives, of *Yuft*, of calf leather, of goat and sheep's leather—Dyeing of the leather in various colours—Issue to the Russian troops of Turkistán of goat or sheep-skin trowsers—Manufacture of *Guzárs* and of *Sauras*—State of the leather trade in Turkistán—Defects of native leathern goods—Question as to the establishment of tanneries in Turkistán.

The leather industry of Tuskistán, like all others, is in its infancy. The preparation of furs is carried on by the natives in the following manner. The skin is washed in warm water, and every particle of flesh

---

[1] *Lit.*, Eye-bands.—*Trans.*

&c., having been removed therefrom with a knife, it is several times steeped, during the space of four to five days, in sour and salted cow's milk. It is then spread out in the sun, and when dry is well rubbed with the hands. In order to preserve the fur from damp, the skin is smoke-dried, and again rubbed with the hands. The wool is then combed out, and the inner side rubbed with chalk.

The following are the leather productions of Turkistán :—

(1) *Yuft*, or leather made from cattle-skins. The preparation of this is carried on in the following manner. The skin, either raw or dry, is soaked, and then buried in a pit, bricked or plastered round with alabaster, together with some quick-lime, in which charred grass (*ishkár*[1]) is mixed. The skin lies in this mixture for from seven to ten days, when the wool is taken off with a blunt knife. The skin is then dragged through an *arik* (water channel), in order to remove the ashes, &c. Skins, after being thus washed, are immersed in a specially constructed caldron filled with barley-flour paste of the consistency of jelly. After lying in this for a period not exceeding 24 hours, the skins are scraped on the inside with a narrow iron sort of plane, and are then thrown into a pit, boarded round with planks, 6 feet long 4½ feet wide and 1 foot deep, into which a mixture of tannine and warm water is poured. The tannine comes from the root of a mountain plant called by the Kirghiz *tarin*. The skins whilst in the pit are rinsed by two workmen from four to six times in the 24 hours, after which they are carefully taken out and rubbed with salt and hung on poles or ropes to dry. They are finally smeared over with fat from the tail of the *dumba*, or fat-tailed sheep, and smoothed on the front side with a wooden polisher. *Yuft* so prepared costs in the native markets from 1½ to 3½ *roubles* (3*s*. 9*d*. to 8*s*. 9*d*.) a piece, according to size. On account of its rude and imperfect manufacture, this species of goods is but little made in Turkistán. The greater proportion of the well-to-do native people purchase Russian imported *yuft*, which is for the most part dyed in bright colours, especially for the Central-Asian market. Native *yuft* is principally used in the manufacture of saddlery.

(2) Calf-skin leather (*opoik*) is prepared in the same manner as *yuft*, but considerably quicker, and with the use of less expensive materials. It is therefore considerably lower in price, and can be had for from 35 to 40 *kopaikas* (from 1*s*. ½*d*. to 1*s*.) a piece.

This material is also used for saddlery, but being of native manufacture is, generally speaking, not at all durable. Articles made of it are sometimes ornamented with silver, turquoises, cornelians, garnets, &c. The cost of a plain bridle made of calf leather without ornament is from 1 to 3 *roubles* (2*s*. 6*d*. to 7*s*. 6*d*.).

(3) Goat and sheep-skin leather is in extensive use, not only in Turkistán, but throughout Central Asia, both among the nomads and the settled population. It is used either in the form of chamois leather, dyed either of a crimson or yellow colour, from which trowsers (*chambárs*) are made, or black, to be made up into boots.

The manufacture of the former class of goods is carried on by the natives in the following manner. The goat or sheep-skin is kept for from one to five days in pits especially made for the purpose, full of water; the fleshy side of the skin (*ilyáchi*) is first rubbed over with a fluid solution of lime, and then folded double, hair or wool outwards, and dried on poles. When the drying is completed the hair or wool is removed by hand. This finished, a mixture of lime and soda (*ishkár*) with water, in the proportion of two of the former to one of the latter, is poured into a pit lined with brick, and the skin is immersed in this solution from three to four days. On being taken out the skin is hung on a thick pole, and its outer surface is scraped with a curved knife called (*yurak*) held in both hands. The skin goes now to be washed, for which purpose it is kept in a channel of running water for two days, and then both sides of it are rubbed with a liquid paste called *kaptárbuga*, or pigeon's dung. Soaked with this for a single night the skin is cleared of all grease and thoroughly washed.

---

[1] The basis of *ishkár*, according to chemical analysis, is an alkali (carbonate of *natrum*).—*Author*.

Leather so prepared is now boiled in a large caldron for one day of 12 hours in a solution of saltpetre or *shurá* (obtained from a salt marsh) and water. After this the leather is smoked in specially constructed ovens dug in the earth, and fitted with a very narrow clay chimney. The smoking operation does not last more than half a minute, and the leather is again scraped with the *yurak*, or curved knife, during which process a very thin upper layer is removed from its surface, so as to give the material the appearance of chamois' leather. The scraping removes, too, from the fleshy side the last remnants of fat or flesh. At this stage the leather is known under the name of *yárgak*. The leather, after being thoroughly washed in water for the space of one hour, is wrung out with the hand, and subjected, before dyeing, to a tanning process, which consists in soaking it for the space of half a day in a hot solution of *karmak* (the root of rhubarb). Moist lumps of this root are crushed and thrown into hot water, in the proportion of about 3lbs. to 20 pieces of *yárgak*.

The dyeing is carried out with the help of sandal-wood (*lignum sandalum*), called by the natives *Kizil-Bák*, which is imported from Russia. To prepare the *yárgak* for the purpose, it is put into a solution of alum, and then dipped into a hot decoction of sandal-wood placed in a specially made cup, called a *tatchar*. *Yárgak* dyed in this way is hung out on poles or ropes, and when sufficiently dry the superfluous colour is removed with a blunt iron knife.

Leather made up into trowsers and issued to the Turkistán troops is dyed of a claret colour with the aid of *fuchsine*, which is imported from Russia.

Goat-skins, for native boots, &c., are dyed with *buzguntch*[1], an excrescence on the leaves of the pistachio tree. To this is added a powder (*zaka*), (a kind of clay found in the neighbourhood of the towns of Aulie-Ata and Turkistán, in the vicinity of lakes). Madder, too, is used for red colouring, and *isparak*[2] for giving a black shade.

The price of chamois leather in Turkistán is almost everywhere the same. The best and largest pieces of goat leather, without any tear or spots, cost 1½ *roubles* (3*s.* 9*d.*), medium kinds from 80 *kopaikas* to 1 *rouble* (2*s.* to 2*s.* 6*d.*).

---

[1] *Buzguntch* is not a fruit, as some have supposed, but the gall nut of the pistachio tree. Schuyler's Turkistán, page 182, Vol. I.—*Trans.*

[2] *Isparak*, a sulphur yellow larkspur (*Delphinium Sulphureum*), page 182, Vol. I, Schuyler.—*Trans.*

Sheep's leather is much cheaper, *viz.*, from 30 to 40 *kopaikas* (from 9*d.* to 1*s.*) a piece.

Two large pieces of leather are sufficient for the widest pair of *sharowárs* (*shalbárs* or trowsers). The natives, and especially the nomads, prefer that this kind of garment should be dyed yellow. Besides this they often work into them stripes of silk of variegated colours. These *sharowárs* (or *chambárs*) are usually of a wide cut. And during the winter, when riding, the natives stuff the ends of the wadded upper garment into the *sharowárs*, an arrangement which they find to be warmer.

As soon as the Russian troops saw the *sharowárs* they immediately adopted it.

Their softness, lightness, and durability, as also the property of keeping out the dust or wind, and of affording protection from damp of every kind, and above all their low price, all speak in their favour. The original yellow colour being liable to soil, and also unpleasing to Russian eyes, was soon replaced by a claret shade, and in 1869, Military Department Order, No. 149 of $\frac{\text{26th April}}{\text{8th May}}$, formally included these garments in the list of articles furnished to the Turkistán troops by the Commissariat Department. Their period of wear was at the same time fixed at two years. When made at the expense of the Government their price is 3½ *roubles* (8*s.* 9*d.*).

Chambárs of goat's leather are preferred to those of sheep's skin, because they are softer; but the latter kind is considerably cheaper, being only from 1 to 1¼ *roubles* (2*s.* 6*d.* to 3*s.* 1½*d.*) a piece. *Chambárs* of the red shade, whether worn at ordinary times or on service, soon fade and become dirty and brown. It is, therefore, necessary to renew the dye from time to time, and this is done by the soldiers themselves by smearing the outside of the *chambárs* with a decoction of the red sandal-wood.

Among the Cossacks the *chambár* has come into more general use than with the infantry soldier, because for riding it is impossible to find a better garment.

Native-made *chambárs* have also been adopted by the Turkistán officers, who are, however, only permitted to wear them in the field[1].

Of the whole skin of the goat the natives make a peculiar kind of bag (*tursuk*) for holding water on long marches in the sultry deserts. The same receptacle is used in large numbers by the nomads for holding their favourite beverage, *koumiss*[2].

Turkistán troops likewise use them on their marches over the waterless steppes.

(4) *Guzárs.*—Under this name are known in Turkistán the skins of camels, oxen, and *yáks*[3] made up into a kind of buck-skin. The best of these skins, that of the *yák*, are used for making the stouter description of harness work and the straps worn by the natives as girdles, from which are suspended various small articles, such as a knife, flint, comb,

---

[1] Some officers, with a view to economy, had some leather *sharowárs* of the prescribed pattern made and dyed black. These when new cost about 4 *roubles* (10*s.*) and were in no way distinguishable from trowsers made of cloth, but the art of native dyeing was shown to be in this case excessively feeble, as the beautiful black very soon turned to a shade of brown that required constant renewal.—*Author.*

[2] Fermented milk of the mare or of the she-ass.—*Trans.*

[3] *Yák or kutas,* the Káshgár ox.—*Author.*

&c. *Guzárs* of camel and ox leather are used principally for the soles of boots. They cost much more than *yufts*, as their manufacture requires a greater amount of material and manipulation.

(5) *Sauras* are a kind of leathern golosh made by the natives after the manner of Russian *shagreens* (ass's or horse's hide), to which, however, they are very inferior[1].

The natives of *Central* Asia call the croup of horses or asses *saura*. Skins taken therefrom receive during their dressing a dye of a rather pretty bright-green colour. The *Saura* leather is prepared in the following manner.

The piece of hide (*ogúzok*[2]) is steeped in alkali for 24 hours. The fleshy parts are then removed with an iron knife (*tupik*), and the hair is scraped off with a sharp one. After this, in order to give the upper surface a rough appearance, millet seeds are crushed over it with a mallet, and the skin hung up to dry in the sun. The hide is then again moistened and strewed over with copper filings mixed with arsenic and some secret composition. The latter gives firmness to the leather whilst the copper and the arsenic dyes it of a green colour.

Sauras are used principally in making goloshes, also for heel pieces for boots, for the scabbards of knives, for ornamenting saddles, and generally in all saddlery work where great strength is required, since this sort of leather is thick and of the texture of pig skin, firm and very durable, although heavy to wear.

Saura goloshes cost about 3 *roubles* (7*s*. 6*d*.) and are always worn by the true believers because of the bad quality of native boots which are made with soft soles and indeed more resemble leather socks[3]. *Saura* goloshes, too, preserve the foot from splinters, and also afford protection in summer from the sultry heat and in winter from wind. On entering a house the goloshes are always left at the threshold[4] or in niches constructed expressly for them in the houses.

It has been already observed that the leather trade of Turkistán is in its infancy. The methods of leather-dressing are of the most primitive kind, and no factories exist. The natives manufacture a kind of half-tanned, half-tawed leather. This trade is carried on in small mud huts built on the banks of an *arik* (canal). In the place of the boarded pits which we have noticed in the description of the leather industry, alkali and tanning pits are dug out, but since neither of these protect their contents from the effects of the atmosphere the material loses much of its strength.

Skins dressed by the natives are not sufficient even for local saddlery demands. Hence both the Russian settlers and the native inhabitants prefer skins which are imported from Russia. The best leather goods which reach Turkistán and Central Asia generally come from Petropavlovsk, Omsk, Tumen, Kungur, Perm, Troitsk, Orenburg, and even from Kazán.

Notwithstanding their dearness, Russian leather goods still comprise an appreciable article of export to Turkistán. There is, however, no local want of raw material, so that if any speculator were to appear and to erect a leather factory in Turkistán, he might count on a good and certain sale.

---

[1] See page 183, Vol. I, Schuyler's Turkistán.—*Trans.*

[2] This word implies that the skin is taken from the rump of the animal.—*Trans.*

[3] Boots of goat skin leather cost at Táshkand 1-30 *roubles* (3s. 3*d*). The more well-to-do native wears boots made of Russian *yuft*.—*Author.*

[4] The same custom prevails in Russia, and is one of the many indications of the Tartar origin of the Russian people.—*Trans.*

For the construction of such a factory it would not be necessary to import from European Russia either machinery or apparatus, except only a few instruments, and these would not cost much. Neither would the construction of a factory entail the outlay of any great amount of capital.

In the construction of a factory one article would, it is true, cost more than in European Russia, that is, the wooden vats.

Of raw material there is no lack, as we have said, thanks to the sufficient development of cattle-breeding.

The sale of manufactured leather is also secure, as is shown by the number of consumers, amongst not only the native but also the Russian population. Amongst these the troops would take a prominent place, for whom it is now necessary to send for boot and shoes from European Russia. The cost of the transport of these for some thousands of miles is very heavy, and the price of all leather goods supplied to the troops by the several contractors is extremely high.

If a leather factory were erected on the spot, the Russian population would be directly benefited, and one cannot help wishing that a Russian leather factory were established in Turkistán on a rational basis.

CHAPTER VI.

CATTLE-BREEDING.

Wide development of cattle-breeding throughout Central Asia generally—Number of head of cattle in Turkistán—Impediments to the successful extension of cattle-rearing in Turkistán—Sheep-breeding—Kinds of sheep in Central Asia—Lambs—Products obtained from sheep—The various diseases that prevail among sheep—Impediments to the extension of sheep-rearing—Price of sheep—Breeding of horned cattle in Turkistán—Horned cattle in the Kuljan region—Price of horned cattle—Goats.

The Turkistán tract is partly composed of vast steppe and partly of mountainous regions, comprising extensive valleys covered with luxuriant and succulent grasses. It is, therefore, especially favourable for the development of cattle-breeding. Here then is the reason why not only the nomad population of the steppes, but also of the mountains, occupy themselves to a considerable extent in this industry.

The number of head of cattle which the nomads of the Turkistán circle possess is enormous. Any one travelling through the country may be convinced of this by the most superficial observation. From the top of the hills or elevated ridges, whence a glance may be thrown over the vast expanse, the eye will frequently see here and there, amidst the fresh green grass, tens of thousands head of cattle. Cattle-breeders possessing a thousand head are not rare in Turkistán. Unfortunately it is as yet very difficult to define the number of the cattle in the country. The natives have not yet acquired perfect confidence in the Russian rule and so conceal their wealth. Hence it is extremely difficult to obtain reliable figures as to the number of head of cattle which the natives easily conceal in their vast grazing grounds from Russian government officials.

On the basis of information collected through the chiefs of districts, it appears that the province of Semiraitchensk holds the first place in the circle in respect of the number of cattle, and in this province the quantity of sheep, of horned cattle, and of horses, is nearly double the number of the same animals in the province of the Sir-Daria.

It is only in the number of its camels that the former yields to the latter. The richest cattle district of the province of Semiraitchensk is that of Vairnoye. In the province of the Sir, Aulie-Ata has the most cattle, and in this respect it is the equal of the district of Kopál in the province of Semiraitchensk.

The Fargána province is comparatively poor in cattle, and in this respect yields to the Vairnoye district of the province of Semiraitchensk. In the Turkistán circle sheep-breeding has been most highly developed. The whole number of sheep is estimated at 11,351,278 head, and the value of these is computed at 34,053,834 *roubles* (£4,256,729-10). Next in importance comes its horse-breeding, the total number of horses being 1,602,116 head, valued at 32,042,320 *roubles* (£4,005,290). The horned cattle of the Turkistán circle are estimated at 1,160,000 head, valued at 17,400,000 *roubles* (£2,175,000), and it has 390,361 camels, valued at 15,614,440 *roubles* (£1,951,805).

The number of cattle, &c., in the several localities of the Turkistán circle is seen in the annexed table, borrowed from the returns submitted to the Governor-General.

PROVINCES AND DISTRICTS.	Camels.	Horses.	Horned Cattle.	Sheep.	VALUE.* Camels.	VALUE.* Horses.	VALUE.* Horned Cattle.	VALUE.* Sheep.	VALUE.* TOTAL.
Vairnoye District . .	27,242	279.248	140,143	2,773,507	1,089,680	5,584,960	2,102,145	8.320,521	17,097,306
Kopál " . .	19,555	104,201	71,601	821,547	782,200	2,084,020	1,074.015	2,464,641	6,404,876
Issik-Kul " . .	7,449	169,246	98,212	629,190	297,960	3,384.920	1,473,180	1,887,570	7,043.630
Tokmák " . .	19,210	154,319	85,034	738,046	768,400	3,086,380	1,275,510	2,214,138	7,344.428
Sergiopol " . .	15,537	86,863	55,263	635,896	621,480	1,737,260	828,945	1,907,688	5,095.373
Kulja region . .	8,419	98,930	77,969	697,581	336,760	1,978,600	1,094,535	2,090,743	5,502,638
Semiraitchensk Province . . .	**97,412**	**892,807**	**523,222**	**6,295,767**	**3,896,480**	**17,856,140**	**7,848,330**	**18,887,301**	**48,488,251**
Kázalinsk District . .	73,463	52,173	15,489	576,732	2,938,520	1,043,460	232,335	1,730,196	5,945,511
Perovski " . .	10,398	62,334	26 381	624.063	415,920	1,246,680	405,715	1,872,189	3,960,504
Turkistán " . .	49,085	24,921	9,971	279,286	1,963.400	498,420	149,565	837,858	3,449,243
Chimkand " . .	56.814	44,800	38,410	528,500	2,972,560	896,000	576.150	1,585,500	5,330,210
Aulie-Ata " . .	20,539	115,023	87,358	548,551	821,560	2,300,460	1,310,370	1,645,653	6,078,043
Kuráma " . .	25,141	64.232	79,703	394,439	1,005,640	1,204,640	1,195,545	1,183,713	4,569,142
Khojand " . .	6,690	32,080	34.427	231,196	267,600	641,600	513,408	693,588	2,116,193
Sir Daria Province .	**242,130**	**395,563**	**293,537**	**3,182,767**	**9,685,200**	**7,911,260**	**4,403,085**	**9,548,301**	**31,347,864**
Sámarkand Section . .	1,200	30,191	40,042	35,000	48,000	603,820	600,630	105.000	1,357,450
Kátta-Kurgán " . .	50	15,000	26.000	100,000	2,000	300,000	399,000	300,000	992,000
Panjkand " . .	8	6,800	18,421	148,000	320	136.000	276,315	444,000	856,635
Zarafshan Circle .	**1,258**	**51,991**	**84,463**	**283,000**	**50,320**	**1,039,820**	**1,266,945**	**849,000**	**3,206,083**
Fargana Province .	**38,294**	**213,760**	**220,717**	**1,260,138**	**1,531,760**	**4,275,200**	**3,310,755**	**3,780,414**	**12,818,129**
Amu-Daria Section . .	11,267	47,995	38,070	329,606	450,680	959,900	571,050	988,818	2,970,448
TOTAL .	390,361	1,602,116	160,000	11,351,278	15,614,440	32,042,320	17,400,000	34,053,834	99,030,759

---

* By dividing each set of figures by 8 the equivalent value of the *rouble* in English currency is arrived at.—*Trans.*

The chief obstacle to cattle-breeding in Central Asia lies in the absence of any shelters or drives. It is only the settled inhabitants who make any kind of enclosures. Amongst the nomads the cattle remain all the year round in the open air. The deficiency of building material and the want of workmen explain the absence of such shelters.

In order to protect their droves from the frosts and storms of winter, the Kirghiz endeavour to fix their winter camps either in forests or in clumps of bushes, or amongst reeds, or else, perhaps, in hollows among sandy hillocks. Only rarely, in order to protect the calves and lambs from the cold, do they construct small enclosures of wattle or excavate holes covered over with reeds.

The nomads hardly ever store up forage for the winter. The grass in Central-Asian steppes is for the most part poor and scanty, so that it is not possible to reap it. The settlers, therefore, as stated above, sow *Jenushka* (a sort of lucerne), which is harvested and stored for winter use. Amongst the nomads the cattle exist all the year round on *tebenevki* [1], or green pasturage.

For feeding cattle in winter the following routine is observed. The horses go out first, as being best fitted to rake away the snow; after them the horned cattle are driven forth, and lastly the sheep contrive to find some roots on the spots already cleared. It is only for the camels that some small stores of hay and reeds are laid in, for as these animals have no hoofs they are unable to procure food for themselves from underneath the snow.

It can be understood how greatly cattle must deteriorate under such treatment in the course of a winter: and if there should be a glazed frost, that is to say a frost after a thaw or heavy drifts of snow, the cattle, through inability to break through the crust and to rake away the deep snow, perish by thousands of hunger and cold.

The condition of the cattle during the summer is not, however, much better than in the winter. They are driven out to pasture during the strong heat of the sun, where at a temperature of 45° Réaumur they munch the sun-parched grass. In the evening, after a rapid change from sultry heat to a cool temperature, the animals are driven together in a herd into enclosures which are very seldom covered over. It will be understood that the sudden change of temperature must have an influence on the health of beasts that at night, when it becomes cool, ought to be strengthening themselves with food, so as to counteract the injurious effect of the sudden change. But at such a time there is nothing for them to eat. On the setting-in again of the heat the herds are again driven out to pasture, where, under a broiling sun, the nourishment they contrive to find is very poor indeed. In consequence of such treatment it is natural that murrains should be very frequent, or without exaggeration it might be said that they are never at an end [2].

Of the domestic animals of Turkistán the sheep is bred most of all. The figures given in the table on page 61 show that sheep comprise four-fifths of the total head of cattle. After sheep come in the following order horses, horned cattle, and last of all camels. The settled inhabitants, too, breed mules, and the semi-nomads keep a small number of goats. The Kirghiz, who nomadise in the southern parts of the province of Fargána and on the Alai, possess *yáks*, a Mongol breed of ox, which with them take the place of horned cattle and are used for purposes of transport in the course of their peregrinations.

---

[1] Literally, that which lies beneath the feet.—*Trans.*

[2] Lieutenant Colonel H. M. Bengough, of the Middlesex Regiment, sent up a translation of pages 1—8 and of pages 48—90, corresponding with pages 1—6 and 34—62 of this edition. But for this contribution I have preferred to substitute what is practically my own translation.—W. E. G.

The first place in native cattle-rearing belongs, as we have said, to sheep. Indeed in sheep-breeding is centred the chief condition and well-being of the nomad races. Sheep furnish them with food, drink, shelter, and also money obtained by their sale in European Russia and in the Independent States of Káshgária, China, and Bukhára.

A flock of sheep in the possession of the nomads is sometimes so large as to be beyond the reckoning of the owners.

Throughout Turkistán and Central Asia generally (the Turkomán steppes excepted) one breed of sheep only is known, *viz.*, the *dumba*, or fat-tailed sheep or *Kurdak.* The distinguishing features of this breed are comprised in large size, drooping ears, projecting frontal bone and thick fatty tail, which sometimes weighs about 18 lbs. This breed is possessed of extraordinary strength and powers of endurance, and is classified as the Kirghiz sheep, or *Kázak-Koi*, and the Uzbak sheep, or *Uzbak-Koi.* The former yields the better kind of wool, but even this, it must be said, is coarse ; its flesh is, however, as a rule very savoury.

The native breeds of sheep lamb once only during the year. At this season the nomads keep a strict watch to see that the lambs are not thrown late during the autumn, when there is no fodder for the ewes. The result of such supervision is that the lambs are thrown in couplets during the months of March or April. The lamb[1] is suckled by the ewe for about two or three weeks, after which the young ones are driven out for the whole day to graze in separate herds, being allowed to suckle for a short time only during the milking hour of the morning, and it is then that they get the greatest amount of milk. At nights, when all the animals (horses excepted) are driven off to the *yurtas*, or felt tents, the lambs are fastened with cords to stakes until the final milking of the ewes has been finished. They are then let loose, but with the cords still fastened to their necks, to search out their respective mothers, with whom they remain throughout the night, *i. e.*, from 8 or 10 P.M. till sunrise the next day, when the herds are once more driven out to graze.

Although such a separation of the ewes and lambs takes place, and although the latter live on nothing but young and tender grass, they in no way suffer, but on the contrary, in the course of a year, develop into strong sheep and are then called *tokhtas.* Meanwhile the ewes continue to furnish their Kirghiz masters with food not only for the whole summer but the autumn as well, the yield of their milk, especially at first, being in extraordinary quantity. A cheese, too, made from the milk of one ewe will sometimes last for a whole winter.

The milking of the ewes during the summer (*i.e.*, in July and August) generally takes place three times during the day. The milk collected on each occasion is fermented, and under the name of *airán* serves both as solid and liquid food. Any milk that may be over, after eating, is used in the manufacture of a creamy sweetish cheese called *yeremtchik*, and is eaten either with some tea or after a course of meat. Another cheese called *krut*, which is generally firm and sour, is made later on, *i.e.*, when the autumn falls and before the sheep-shearing and rolling of the felts are put in hand. The latter kind of cheese is thus prepared. Milk is boiled in cast-iron kettles until it has become to a considerable degree condensed. It is then left to cool, and when this has taken place the mass is rolled up into small balls which are spread out in the sun. *Krut* is not, like *yeremtchik*, eaten in a solid form, but is placed in hot water, in which it is stirred about for a long time until an infusion has been formed, which is said to be distinguished for its unusual amount of nourishment. During the winter this beverage takes the place amongst the nomads of the fermented milk of the mare, called *Koumiss*, which is obtainable only in the summer and occasionally during the autumn.

---

[1] Lambs are at first called *Kozis.*—*Author*

Sheep-shearing takes place twice every year, *viz.*, in the spring and autumn seasons. On the latter occasion sheep of one and two years, that are not likely to go through a severe winter, are slaughtered, and at the same time the greater proportion of the older sheep are killed for winter consumption. The quantity of meat which is thus stored up for each family is calculated according to the number of the male members only. If there be cheeses, grain, and venison or game in store, the consumption of meat is computed at from one-fourth to one-half sheep per man per week.

The poorer nomads eat no meat at all but live on barley, *krut*, and *airán*.

Disease is almost unknown amongst Kirghiz breeds of sheep, except that a few die from foot-and-mouth disease, and in the districts conterminous with Siberia a few are lost by *yázva*, or the Siberian plague. The first of these diseases appears in the cracking of the hoof and in a swelling above the knees induced thereby. The cause of this disease is not known, and no precautions are taken against it, except that the length of the daily peregrinations may be reduced to a distance of 10 *versts* ($6\frac{2}{3}$ miles), or perhaps less, or by making a halt of from two to four days according to the abundance or otherwise of grass.

But sheep-rearing amongst the nomads has other scourges, incomparably more terrible than either of the two above-mentioned diseases, to wit, storms and glazed frosts. From storms the sheep perish in thousands. Unexpectedly overtaken by bad weather, the animals are driven by the wind to take shelter in snow drifts, or in ravines where they fall down in the snow and perish from hunger ere the storm has passed. Glazed frosts, too, destroy the sheep in lesser numbers. Herein is found the reason why the Kirghiz pay the Cossacks and other Russian settlers such large prices for their stores of hay. However easily obtainable may be their stores, the Kirghiz will only hurry to rescue from great straits those animals which they consider the most necessary to themselves, such as camels or other animals required to add to the several breeds. The rest are complacently driven off to a better locality, although it may be felt that on the road to this promised land the whole may be lost.

Thanks to Russian influence, the more affluent Kirghiz have, by taking example from the Cossacks and other Russian settlers, begun to lay in their winter quarters stores of hay, and to construct within large enclosures sheds or pits for the shelter of their herds from the winter rain or snow. Nomads who have no such shelter for their flocks, on the bursting of a storm bring the lambs into their own *yúrtas*, or sleeping-places. Bred in a severe school, the native sheep are possessed of extraordinary tenacity of life, but notwithstanding this their autumn and winter privations and inability to get food cause them to terribly deteriorate. With the setting-in of the spring, the re-appearance of the fresh grass, and the recommencement of the wanderings, the sheep and all the other animals pick up with great rapidity, for in two or three weeks' time emaciated animals will have reached a weight of from 180 to 216 pounds.

The price of sheep varies greatly and depends on many causes. Generally speaking, sheep are cheaper in winter than in summer. A lean sheep may sometimes be sold for one *rouble* (2*s*. 6*d*.), but on the other hand a well-conditioned animal will fetch from 5 to 6 *roubles* (12*s*. 6*d*. to 15*s*.). In Turkistán three silver *roubles* (9*s*.) may be considered the average price of a full-grown wether. With respect to the sheep-rearing of Turkistán it should be observed that it comprises one of the most material sources of the wealth of the country. The export of wool to European Russia increases with each year, and would increase still more if means were adopted for the improvement of the breeds in view to the improvement at the same time of the quality of their fleeces.

Horned cattle, as we have seen from the above appended tables, are bred in small quantities. They in no way differ from the breed of Little Russia, or of the Caucasus, except that they are somewhat smaller and slighter, the result of thorough neglect in their supervision.

The small scale of their holdings affords the natives the possibility of cultivating their land with undersized oxen.

Amongst the Kirghiz horned cattle have only begun to increase in comparatively recent times, from the days when a man's property became secure from plunder on the part of his neighbour. The poorer Kirghiz use horned cattle in place of horses, as they find their keep a simpler matter, whilst the use they get out of them is multifarious. In the basin of the Sir-Daria, the cow came to the Kirghiz from the Kára-Kálpaks, and eastward of this point the same animal was brought to the Cis-Chu steppe from the Kálmaks.

The horned cattle of Turkistán are subject to frequent epidemics. Like the sheep they perish from bad supervision, and in the northern parts of the country from the effects of glazed frost and storms.

Comparatively speaking, but a small number of horned cattle are met with in the province of Semiraitchensk. But those that there are, and also those eastwards in the direction of the Kulja region, are distinguishable by their size, which exceeds that of similar animals in the provinces of the Sir-Daria and Fargána and in the Zarafshán circle. Of an exceptionally good kind are the cattle in the Cossack stations and Russian settlements of the province of Semiraitchensk. Herein and also in the Ili tract, transport of almost every kind is carried on by the aid of cattle. Besides being remarkable for their large proportions, these animals are possessed of comparatively short but strong legs.

Transport oxen are shod with small double shoes, and the animal when fitted with these is rolled over on the ground and has its legs tied together. The load that oxen will drag in carts (*arabás*) weighs about 30 *puds* (1,080 lbs). The length of a journey performed with such a load will vary from 20 to 25 *versts* (13⅓ to 16⅓ miles), and this in mountainous localities will be reduced to 7, or perhaps 6 *versts* (4⅔ to 4 miles).

The usual load placed on the back of an ox is 12 *puds* (432 lbs), and with this the animal will go from 30 to 35 *versts* (20 to 23⅓ miles) in the 24 hours. When ridden they are saddled like a horse, and will then traverse their 40 *versts* (26⅔ miles) within the same period.

It is interesting to learn that amongst the Kirghiz there have occasionally appeared bulls and oxen with a quick and fairly rapid pace like an amble. When ridden the animal is guided by a cord fastened to a ring let into the nose. In the Kuljan tract the Tarántchis castrate bulls of three or four years, and after this they begin their service, which at first is light, *i.e.*, under a saddle or in harness. On reaching its eighth year the ox is considered to be full grown and fit to draw a load. This heavy service continues until the animal has reached its twentieth year, after which it is fattened up with soaked pulse, &c., and sold for its meat, which usually fetches about 30 *roubles* (£3-15). The price of a transport ox in Kulja varies from 40 to 55 *roubles* (£5 to £6-17-6). During the months of April, May, and June Tarántchi herds roam about the fields, and when July sets in they are no longer permitted to do so because at this time the harvest has been collected, and the cattle are required for threshing. The price of cows in the Ili tract is not high, a good cow with calf selling at from 12 to 15 *roubles* (£1-10 to £1-17-6). The same price obtains, too, in other parts of Turkistán and applies to ordinary oxen as well as cows. A cow without a calf is almost unheard of in the native households of Turkistán, because the animal will give no milk unless it has one.

Goats are also bred in Turkistán, but in small numbers. Central-Asian goats have a great resemblance to the Tibetan breed, except that they are taller and of stronger build. They are covered with a reddish fleece, which is very long, and underneath this lies a beautiful white fur well adapted for a fine web and capable of taking bright colours when dyed. Goats serve as guides to flocks of sheep, and besides this are useful to the natives for the milk, meat, wool, and skin which they supply. The latter, as we have seen, is made up into chamois leather for *chambárs*, or pantaloons, boots, and the like. The average price of a goat is 2½ *roubles* (6*s*. 3*d*.).

CHAPTER VII.

SPORT.

(Fishing, hunting of wild beasts and birds, and sport of every kind.)

Russian Company established in 1847 for fish-catching in the Aral—Impediments to the development of fish-catching in Turkistán—Fish-catching by the natives—Fishing settlements at the mouth of the Sir-Daria—Prices of fish at Kázalinsk and at Táshkand—Fisheries of the Province of Semiraitchensk—Mr. Vanushin's fishing company on the Amu-Daria—Hunting of wild beasts—Sport after tigers, bears, lynxes, wolves, &c., &c., &c.—*Marál* hunting—Horns of the *Marál*—Yearly quantity of wild beasts caught in the neighbourhood of Lake Issik-Kul—Methods of hunting practised by the natives in the case of both beasts and birds—Hawking—Prices of furs of various kinds at Táshkand.

The rivers and lakes of Turkistán are well stocked with fish of every kind, so much so that fishing might be converted into a very profitable article of industry. Unfortunately, the natives are but little engaged therein, and those of them who are so are nomads, for the settled Mussulmán inhabitants do not use fish at all for food.

As a pursuit, fishing only came to be followed by the Russians from the date of the establishment of fortified posts along the Sir-Daria. Contemporaneous with the commencement of the erection in 1847 of Fort Raim[1], near the mouth of the Sir, a working company was formed at Orenburgh with the object of establishing fisheries in the sea of Aral. This company built for itself a vessel called the "Michael," and with this was associated a dismantled war vessel the "Nicholas," lying at Raim. In the following year both these vessels were taken down and launched in the sea. But the existence of the said company was not a long one, and it soon broke up in consequence of the difficulty of transporting the fish to Orenburgh, and of the loss of time involved in a long transit. When forts had been built along the Sir-Daria, the Government, wishing to enliven the life of the garrisons, endeavoured to create amongst the rank and file a taste for fishing. To this end it provided the requisite nets, &c., and organised special commands, &c., &c. In the year 1859 certain of the settlers in Fort No. 1 formed a fishing company which brought them in considerable profits. Still the sale of fish did not extend beyond the Sir-Daria fortified points. In 1861, the commandant of Fort Perovski made an attempt to convey fish to Bokhára. Fish weighing 650 *puds* (23,400 lbs) were prepared in the Bokhárian method, and it was reckoned that the caravan would convey the consignment to Bokhára in fifteen days, but bad weather, which followed the late departure from the fort, detained the caravan on the road, and the subsequent advent of warm weather caused the fish to go bad, and therefore on arrival at Bokhára the consignment had to be sold at a loss.

Fish-catching is carried on by the natives in the most primitive way. The smaller kinds are taken with a line, the larger are stuck with spears; nets are unknown to them. Within the limits of the province of the Sir-Daria the most noticeable fish industry is carried on at Kázalinsk.

A portion of the inhabitants of this town possesses about a dozen reed huts on the sandy island of Kos-Aral, which is open to all three arms of the Sir before that river finally enters the Aral Sea. In the year 1849 the Russians built a small fort on this island, the ruins of which are preserved to the present day. A Russian village now stands on the bank of the Sir close to its mouth. During the spring and summer a very small number of the fishermen remains, but in the autumn this number is augmented, because the take of fish at this season is very much larger than during the summer months. The fish are caught with small hooks and those taken are for the most part sturgeon (from which they get caviare, *visiga,* and glue). In Kázalinsk fish fetches $1\frac{3}{5}$ and 2 *roubles* (4 and 5 shillings) per *pud* (36 ℔s) : caviare sells at 1*s.* 3*d.* per ℔, glue at $1\frac{3}{5}$ *roubles* (4*s.*), and *visiga* at one shilling per ℔.

---

[1] Also called Fort Aral.—*Trans.*

Only a small quantity of the fish taken is consumed at Kázalinsk, the rest being transported to Orenburgh. The extent of this export is not, however, great and amounts in value to 3,000 *roubles* (£375) *per annum.*

Fish is imported to Táshkand from Chináz and costs from 7 to 15 *kopaikas* (3*d.* to $4\frac{1}{2}$*d.*) per ℔ (*i.e.* of sturgeon). According to the proportion imported, the price of caviare varies, sometimes going down to 30 *kopaikas* (9*d.*) and sometimes reaching 60 *kopaikas* (1*s.* 6*d.*) per ℔.

The abundance of fish in the Sir-Daria cannot, unfortunately, bring the looked-for profit, because the salt, although near, which is used for salting the fish, is of bad quality. From it the fish and especially the caviare gets an unpleasant taste and moreover easily goes bad. This is probably due to the presence in the salt of sulphureous acid particles.

Within the province of Semiraitchensk the greater amount of fish is caught in the Ili settlement on the river of the same name. The fishing is carried on in the autumn season, and the fish is taken to Vairnoye and there bartered for grain and other necessaries, since the soil of the Ili settlement admits of the inhabitants engaging in agriculture. Salted fish sells in Vairnoye from $1\frac{1}{2}$ to 2 *roubles* (3*s.* 9*d.* to 5*s.*) per *pud,* and *osmans?* from $2\frac{1}{2}$ to $3\frac{1}{4}$ *roubles* (6*s.* 3*d.* to 8*s.* $1\frac{1}{2}$*d.*) per *pud.* Besides the above, carp and dog-fish from the river Chu are procurable at Vairnoye.

In the Issik-Kul lake, fish-catching is the exclusive occupation of the Russian settlers, who sell what they catch in the district town of Kárakol (to the troops and other Government employés). They are thus enabled to send about 500 *roubles* (£62-10) yearly to Vairnoye. The more successful takes occur in the gulfs of Tup (near the village of Preobrajénsk)[1] and Kurmentinsk, especially the latter.

The amount of fish caught in Lake Bálkhásh is not known, but in any case it must be very small on account of the desert character of, and want of population on, the shores of this lake.

A greater development of the fisheries of Turkistán may be expected from the establishment in 1876 of the Trading Company of Vanushin.

This Company has been designed to undertake fisheries in the Aral Sea and on the Amu, and it has in view the supplying with fish both the local requirements of Turkistán and Orenburgh, as well as that of the export trade to Russia. It is proposed to transport the fishing products to Russia by way of the Ust-Urt to Mertvi Kultuk (the creek of death) and along the water communications of the Caspian basin.

---

[1] Literally, village of the Transfiguration.—*Trans.*

With this object the Vanushins have ordered a quantity of nets and other fishing *apparata* to be sent from Gurieff on the Amu-Daria by way of the Emba post, and they intend to launch into the sea of Aral from the gulf of Sári-Chaganák three flat-bottomed and ten small sea keel-boats which are to be brought from Orsk.

The Vanushins have further solicited that the exclusive right of fishing in the sea of Aral may be conceded to them in the shape of a guarantee for ten years to recoup them for the great outlay which their Company must perforce incur in starting the projected undertaking.

On these conditions the Vanushins intend to make use of the Sea of Aral as a means of transporting the products of its southern shores to its barren northern and eastern littoral which is peopled by nomad races only.

This last enterprise, if only it be destined to succeed, will be important in that it will admit of the possibility of the interchange, on the part of the population of the Amu-Daria tract, of their grain and other rural products at a higher price—a *pud* of their wheat now sells for 35 *kopaikas* (about 4½*d.*) only—and of the equalisation of the prices of grain and other products in Kázalinsk, where a *pud* (36 ℔s.) of wheat costs from 80 *kopaikas* to 2 *roubles* (2 to 5 shillings.)

The pursuit of wild beasts and of birds in Turkistán is followed by both natives and Russians. Both the one and the other class, however, practise it more as a pastime, for the poorest people only make a trade of the chase.

Throughout the whole extent of Turkistán the variety of wild beasts and of birds is extraordinarily great. Amongst the chief game species are the following:—

(*a*) Tigers, panthers, and wild boars. These frequent the reeds and thick bushes that edge the lakes and rivers. The number of wild beasts is especially large on the southern and eastern shores of the Sea of Aral, in the reeds of the Sir and of the Amu, in the neighbourhood of Forts Perovski and Chináz, about the ruins of Fort Chárdara, along the course of the Central and Southern Chu, in the reeds of Lake Bálkhásh and of the river Ili, &c., &c.

(*b*) *Bears.*—These live in the mountains whence they descend on to fields that are sown with millet or barley.

(*c*) Lynxes, wolves, foxes (*corsacs*), martens, badgers, hares, squirrels, wild cats, moles, ermines, marmots, *kuláns* (wild asses), wild mountain sheep (*arkháras*) and *maráls*. The last are especially abundant in the province of Semiraitchensk, and form a great attraction to the native population. These *maráls* are prized for their horns, *i.e.*, when they are young, and still in velvet or not ossified. The *maráls* shed their horns yearly, in the months of April and May. The Chinese hold the belief that the new horns of this animal contain an essence capable of instilling fresh strength into the human frame. This belief is so strong that they will give as much as 200 *roubles* (£25) for a pair; whilst on the spot huntsmen will sell them for from 5 to 50 *roubles* (12*s.* 6*d.* to £6-5) according to the measure of their hardness. The most important business in this trade is to know how to keep these horns from spoiling during the hottest season of the year. To do this the horns are slightly salted, and the cracks and flaws in the outer covering of skin carefully greased. The Chinese are thoroughly acquainted with the process and from them the Sárts have learnt it.

Besides the fresh horns just taken from the fallen *marál* that go to China from Vairnoye by way of Kiákhta, they collect in the mountains of Semiraitchia a large quantity in the dry state, *i.e.*, horns which the deer cast yearly at a certain season of the year. Persons engaged in the trade affirm that every year there go from Semiraitchia to Táshkand and thence to adjacent countries, 100 camels laden with dry *marál* horns which are used in Turkistán in various manufactures.

As it may be assumed that 32 pairs of these horns are laden on each camel, it follows that the number collected yearly does not fall short of 3,000 pairs, and these figures indicate the *minimum* of living animals that wander over the mountains of Semiraitchia. The normal price of these horns at Táshkand is 18 *tillas*[1] for a camel-load. They are bought on the spot from Kirghiz by middlemen who give on an average 1 piece of *máta* for every pair tendered.

Marál skins likewise obtain a sale at Táshkand. The price of these at Vairnoye varies from 2 to 4 *roubles* (15*s.* to 10*s.*) a piece. Some distance from the latter town, for example at Kárakol and on the Muzárt Pass, their price is about half. At Táshkand they make of them a tanned leather, which is used in harness and the like.

The quantity of wild beasts in the Semiraitchensk mountains decreases yearly, and the price asked for skins rises in proportion. Formerly in the province of Semiraitchensk a lynx's skin cost 2 *roubles* (5*s.*), a fox's from 60 to 80 *kopaikas* (1*s.* 6*d.* to 2*s.*), a marten's 1½ *roubles* (3*s.* 9*d.*). Now the local prices are 8 *roubles* (£1), 2 *roubles* (5*s.*), and 3 *roubles* (7*s.* 6*d.*) respectively.

Of birds in Turkistán the chief game species is the pheasant, as this bird is found almost everywhere. It is especially abundant in the bushes and reed growths lying between Fort No. 2 and Julek. Besides it, there are swans, geese, ducks, black-cock, partridges, cormorants, &c., &c.

The chase is carried on with firearms, dogs, traps, nooses, &c., &c. Russian soldiers too sometimes shoot the tigers and they are encouraged to do so by the Administration. The reward allowed to a private soldier for the slaughter of a tiger is 25 *roubles* (£3-2-6) for the first and 5 *roubles* (12*s.* 6*d.*) for every succeeding one.

The Kirghiz catch wild boars by digging in their fields and kitchen gardens pits shaped like a bottle. These they cover over with brushwood.

Foxes, martens, lynxes, and other animals are either caught in traps, hunted with dogs, or poisoned with *chelya bukha*, which is placed on the tracks along which these animals are in the habit of going from their holes or lairs to drink water.

Wolves are either killed with sticks or thick whips or are sometimes poisoned with the preparation mentioned. On receiving a blow on the snout with a stick this animal almost instantly expires. But the most general and favourite form of hunting amongst the nomads is with the aid of trained birds of prey, especially the falcon, goshawk, and common eagle.

The falcons, goshawks, and eagles are themselves snared in a very simple way. The four corners of a net are stretched on four short stakes that are fastened securely in the ground. Underneath the net are tied pebbles, small stones, grouse, &c. The bird on swooping down on the prey gets its talons entangled in the net, and thus falls into the hands of the hunter, who keeps it constantly in his *yurta,* or felt tent, attached to a cord, feeds it with his own hands on meat, and after a year's probation, so to speak, takes it out to catch other birds. Whilst engaged in the chase the trained bird rests on the left arm of the master, its eyes being covered over with a leathern hood. The game is started with a drum that is fastened to the master's saddle-bow, the hood is snatched from the eyes of the hawk (or other species of preying bird), and it darts off after the quarry. When this is caught the Kirghiz hunter comes up and releases it, but only to give its head and brains to be devoured by his trained assistant. Should the latter fail in overtaking the started game, it is enticed back to the arm of the Kirghiz with meat which the hunter always carries with him to meet any such emergency.

---

[1] Schuyler on page 203, Vol. I, Turkistán, puts down the value of the *tilla* as variable, being from 9 to 28 *tengas*, a *tenga* being, he says, worth about 5½*d.*—*Trans.*

Foxes, *corsacs* (fox of Tartary), and other animals of the same size and kind are similarly taken. Indeed a good eagle will venture to attack a wolf. Fixing one talon in the wolf's eye, and the other in its flanks, it will keep it until the hunter comes up with his dog. A good eagle is therefore valued at 100 *roubles* (£12-10), a sum which is given also for a well-trained dog.

The best breed of sporting dog is the Turkmán, which is known by the name of *taza.* These dogs are short-haired, exceedingly fleet, and are recognised by their hairy ears and long whiskers which give them a handsome and even elegant appearance. They are very fierce. The dogs of other breeds are possessed of less merit.

When the hunter has neither firearms, nor dogs, nor traps, &c., he has to resort to various devices to get the animal which he is in pursuit of, out of his den.

The Kára-Kirghiz dwelling in the neighbourhood of Lake Issik-kul are those who mostly follow hunting as a livelihood.

According to their own statements they will take in the course of a winter 1,000 skins of marten, 2,600 of fox, 800 of lynx, 100 of bear, 3,000 of wolf[1].

To get *marál* horns 300 hunters are started off in April or May from the Issik-kul district to the rivers Tekes, Muzárt Pass, the Sirt, and other such localities, and they generally manage to get 150 pairs of fresh horns which they dispose of either in Kárakol or Vairnoye, and some of these thence find their way *viâ* Kulja to China.

It must be observed that as a general rule the nomads are ignorant of the real prices of their goods. These, as with all other products of their cattle-rearing, they sell for about next to nothing, and more often barter them for rotten chintz, *máta, vwiboika,* and the like to either Sárt or Tartar merchants, who export them with advantage to European Russia.

Skins of the wild ass are sold in Táshkand and the other large towns of Turkistán, where they are made up as green leather, resembling chamois skin, for the manufacture of goloshes or the heel pieces of boots and generally of all articles that require pretty and very durable material.

---

[1] This information was furnished by the Commandant of the Issik-kul district. It follows, however, that the figures are only approximate and relative as regards the description of skins in question.—*Author.*

The prices of the various skins at Táshkand during 1879 were as follows:—

Marten's, from 3½ to 5⅕ *roubles* (8*s*. 9*d*. to 13*s*.).
Dark-brown fox's, from 8 to 12 *roubles* (£1 to £1 10*s*. 0*d*.).
Yellow fox's, from 1⅗ to 2 *roubles* (3*s*. 3*d*. to 5*s*.).
Bear's from 5 to 10 *roubles* (12*s*. 6*d*. to £1 5*s*.).
Black ditto, from 5 to 6½ *roubles* (12*s*. 6*d*. to 16*s*. 3*d*.).
Grey ditto, from 4 to 5 *roubles* (10*s*. 8*d*. to 12*s*. 6*d*.).
Black sheep's skin, from one *rouble* (2*s*. 6*d*.) and upwards.
Ordinary sheep's skin, from 3 to 5 *roubles* (7*s*. 6*d*. to 12*s*. 6*d*.).
Black Astrakhán (lamb's skin), from 10 to 20 *roubles* (£1 5*s*. 0*d*. to £2 10*s*. 0*d*.).
,, goat's hide, from 10 *roubles* (£1 5*s*. 0*d*.) and upwards.
,, cat's skin, from 1 *rouble* (2*s*. 6*d*.) and upwards.
Wild cat's skin, from 8 to 12 *roubles* (£1 to £1 10*s*. 0*d*.).
Tiger's, from 20 to 25 *roubles* (£2 10*s*. 0*d*. to £3 2*s*. 6*d*.).
Panther's, from 8 to 10 *roubles* (£1 to £1 5*s*. 0*d*.).

CHAPTER VIII.

STUDS.

(Horse-breeding in Central Asia.)

Importance of horse-breeding to the natives of Central Asia—Breeds of horses—*Argamák*—the Uzbak breed—*Kárabairs*—the Kokhandi and Kirghiz breeds—Detailed description of the Kirghiz horse—Its training—The *Baránta*—Endurance of Kirghiz horses—Diseases most common amongst them—Importance to Russia of Kirghiz horse-breeding—Fitness of Kirghiz horses for Russian cavalry remounts—Establishment of a stud near Táshkand—Object of this stud—Prices for horses at various points of Turkistán.

Horse-breeding is extraordinarily well developed in Turkistán. To the natives horses not only serve as beasts of burden but also afford them food and yield milk, out of which they prepare amongst other things the widely diffused and favourite beverage called *koumiss* (fermented milk of the mare). The hide too of the same animal provides them with leather. Hence the natives of Turkistán generally, and especially the nomad portion of its inhabitants, breed horses in vast numbers, but of their treatment and care they have scarcely any idea.

We have given above (on page 61) the number of horses in the various localities of Turkistán. The most common breeds are the *Argamák*, the *Uzbak*, the *Kárabair*, the *Kokhandi*, and the *Kirghiz.*

1. The *Argamák* or, in other words, the *Turkmán* horse comes of Arab stock. This breed is distinguished for its good proportions and comely shape. In height an *Argamák* stands 4 or even 5 *vershóks*[1]. Its back is very handsome, vertebral and croup being straight as an arrow; tail well set, neck high, long, and fine; head rarely large but muzzle inclined to be round; eyes large, chest narrow, legs fine with long pasterns. The pace of this breed is extraordinarily even, and this kind of horse does not know what stumbling means. The *Argamák* cannot, however, stand long marches, especially when such involve scarcity of food and other privations. Still this horse is distinguished for an unusually rapid stride, and in this respect would rival an English racer. It is quite unfit for harness work. The same breed is distributed over Turkmenia, where it receives the greatest care. In Turkistán it is not very common, because the natives do not know how to train good horses and because the richer people only keep them at all.

2. The *Uzbak* is of somewhat smaller proportions than the preceding, and although it yields greatly to the same in point of beauty and slenderness of limb, it is vastly superior to it in respect of strength. Generally speaking, this breed resembles the ordinary horse in use by Russian peasants, and is more adapted for the saddle than for purposes of war.

3. The *Kárabair.* This breed is a cross between the *Argamák* and the Kirghiz stock. *Kárabairs* are strong and fairly well proportioned, and as a rule their legs are short, their chests broad, and their quarters powerful. They are moreover capable of great endurance, and therefore the natives put a high value on them.

---

[1] *Sic* in original. As the *vershók* only equals 1·75 inches, the author would appear to have made some slip of the pen.—*Trans.*

4. The *Kirghiz.* This breed is the most common and best distributed throughout Turkistán. We will therefore speak of it in greater detail.

It would be difficult to define with exactitude the origin of the Kirghiz horse: still more difficult would it be to trace the gradual improvement or falling off of the same stock; difficult because the Kirghiz have no sort of history of this horse. The traditions current amongst them, which are of the nature of pure fictions, do not admit of the construction of any proposition at all approaching to the truth. Nevertheless the qualities of the Kirghiz horse at least testify that it has sprung from a noble breed.

In height it does not exceed 14 hands. Kirghiz horses of 15 hands are very uncommon, and when these are met with the crossing of a larger stock is shown to be of later date than is usually the case.

The head of a Kirghiz horse is a little large and straight in proportion to its height. If it be Roman-nosed it is but slightly so, and only in the lower part of the frontal bone, just for instance as is the case with Russian horses from the Don. The head is generally lean and expressive. It is only in the case of stallions, which the Kirghiz do not as a rule ride much, and which are almost always kept for breeding purposes, that the head is weighted with a coarse and fleshy jowl. The ears are moderately long, lean, well put on, and sometimes of very beautiful shape. The eyes too are often very fine, but in some cases a very convex arch detracts from their size and expression. Horses with an ugly or small eye are rare. The nostrils are tolerably large. The central portion of the lower lip is marked with a lump, and often when the horse is resting this will cause the lip in question to fall at least a finger's breadth below the upper one with which, whilst in movement, it is even. The neck as a rule is well proportioned, but in the case of horses of great speed it is rather long: indeed animals with too short a neck are very rare. The occiput is generally long and the head well set on. Although Kirghiz horses have a soft mouth, there are pullers amongst them. Inverse and arched necks are met with, but they are generally light and lean. Only the entire horses have a thick neck, the coarse crest of which gives them an awkward but not a disagreeable appearance. The neck of the Kirghiz horse may, generally speaking, be said to be well put on, for it is only in certain parts of the steppe country that we find horses with too low a bearing. The withers are fairly high. Animals with low withers and forequarter are rare. The back is of moderate length: the rump small but the barrel sometimes protrudes greatly. Only those who have witnessed the sort of loads that the Kirghiz put on their small horses, and in some instances during fabulously long marches, can thoroughly estimate the strength of a back that has never known a saddle. The croup is of average length and sometimes of very good shape. Kirghiz horses with sloping quarters are rare. The chest is broad and sometimes extraordinarily so with very projecting bones, one of the distinguishing properties of the Kirghiz breed. It is also rather deep. The ribs are flat; tail and mane are long and thin; and especially so in the case of stallions roaming loose about the country. Manes may be seen that reach half-way down the forearm and tails that sweep along the ground.

But what is especially noticeable in the Kirghiz horse are the legs. The forelegs are very straight with a long shoulder and a short forearm, proportions that favour a long stride. The pasterns are short and well set; hoofs very good and firm. The Kirghiz of course never shoe their horses, and Cossacks who assemble for service with shod horses, when reaching the steppe country, find it more expedient to take the shoes off. The legs of the Kirghiz horse are, as a rule, very lean and of average thickness, extreme thinness being never the rule and extra thickness the exception. The tendons stand well out on the fetlock. The hind legs are, generally speaking, very straight. When curved, they are not much so. They are very well set without being turned out or clubbed. The hind quarters are broad, sometimes with very pronounced buttocks and of extraordinary strength. It is very seldom that a Kirghiz horse is seen with anything like a spavin, or indeed with any excrescence on its legs. Owing to the considerable length and comparative small size of this breed of horse, its legs seem to be somewhat short. To any eye that has not for a long time witnessed any but Kirghiz horses, the large breeds that we see, for example, in the streets of St. Petersburg and Moscow, or in cavalry regiments, seem to be long-legged and wanting in muscle. It may, however, be boldly affirmed that amongst the latter class we can never find that relative and absolute breadth which is the characteristic of very many Kirghiz horses. The general impression produced by the best of these may be thus summarized; a small and very long animal with proportionally short legs, lean but expressive head, short back, and distended loins.

Speaking generally, if we except its head, and in some cases its neck, the Kirghiz horse may be called of good proportions. Its development of muscle is so great that one may confidently state in no other breed possessed of the same lightness of movement can we find such a number of compact animals. This circumstance makes the Kirghiz steed in the highest degree capable for the performance of every possible requirement.

Having become acquainted with its exterior appearance let us now pass to its paces.

The Kirghiz horse can be much easier recognised by its movement, which is a very peculiar one, than by its exterior. We will admit that an untrained eye, especially in the winter when the animal is covered with long hair, will not recognise it from any ordinary animal of the same size that is also destitute of breeding and yet a peculiar *tout-ensemble* and lightness of movement, which is perceiveable in all its paces and which is characterised by an unusual action, so soon catch the eye that even a stranger will hardly fail to notice that the animal so moving cannot be an ordinary animal, such as we everywhere see amongst the peasants of European Russia.

The walking action of the Kirghiz horse is pretty and its pace sometimes very rapid. Eight *versts* (5⅓ miles) per hour is not considered anything out of the way, if the animal be considered active and well broken into saddle. Ten *versts* (6⅔) miles per hour and upwards is reckoned very quick. All the higher officials, and many of the officers of the Turkistán military circle, have animals with the latter pace. Sometimes instead of the ordinary walking action the Kirghiz horse moves with a sort of amble during which the feet on the same side of the body touch the ground almost simultaneously (in every such case the animal's hind feet over-reach the fore). This pace is called the *khod*. It is not so even as is the ordinary walk, but nevertheless it is much more agreeable than a sharp trot which in the case of Kirghiz horses, however, is very soft.

The latter pace in respect to this breed is sometimes very swift. It would not be difficult to find animals which in harness would get over a *verst* (⅔ mile) in 2½ minutes.

The gallop of the Kirghiz horse is likewise very easy. Although these animals are not celebrated for speed in racing they can endure labour with peculiar ease, and can, moreover, cover vast stretches of country without food, without water, and without rest. Instances, indeed, have been known where these animals have gone 100 *versts* (66⅔ miles) without any harm.

To what we have said above we must add that all the paces of the Kirghiz horse are very true, and if their feet were not spoilt and they were not ridden to excess they would rarely stumble.

Amongst horses of this breed an animal with an amble (*jurga*) is very common, and a pace of this description is very swift and sometimes remarkably so. A very good ambler moves so quickly that the animal, on which a Kirghiz mounts when he wants to catch the horses in the different runs, not being fit for racing, cannot keep up with an ambler for more than 1 or 1½ *versts* (⅔ to 1 mile). If we further remark that the latter will traverse one *verst* (⅔ mile) and more in 1½ minutes, it becomes clear that no trotter will compete with an ambler.

The Kirghiz are very fond of an ambler and the price therefore which they put upon one is always high[1]. Quiet though an ambler be, his rider is not always at his ease, and hence Russian officers do not care for one particularly, the more so as the belief generally prevails amongst them that an ambler is a stumbler.

The life of a Kirghiz is so bound up with the prosperity of his stud that that individual only is rich whose stud is a good one. The Kirghiz lives by his horse, which brings him in profit likewise at the *baiga*[2]. Thanks to his horse, too, the nomad gets over a vast stretch of steppe and ascends the highest mountain. The Kirghiz loves not to move about on foot, a method of progress to which he resorts only in the absence of any sort of four-footed beast. If he has not a horse he will mount a camel, an ox, a cow, or it may be an eighteen months' old calf. The Kirghiz is fully aware what he owes to the horse and exercises therefore every endeavour to improve his stud.

On account, however, of his peculiar mode of life, he succeeds in doing so but little. In the winter season, when the scanty grass of the steppe is covered over with hard frosts and deep falls of snow, the Kirghiz will search out for his horses some sheltered valley or glen, wherein the snow will admit of the animal digging out some coarse stems of grass with his hoofs. Under such conditions the richer folk will lay in for themselves a winter store of hay; but this is very rarely the case. Indeed it generally happens that those horses, which during the winter season carry their masters to the various portions of the vast steppe, have to satisfy themselves with the snow-hidden grass. The Kirghiz householder does not make the supervision of his stud his own special care; and so it often comes about that a drove of several hundred horses will be left in charge of two boys. Hence, no doubt, is the cause of that development in the steppe of horse-lifting, or in local phraseology the *baránta*. Properly speaking, this term amongst the Kirghiz implies the forcible removal of cattle in return for a herd that has on some occasion or another been driven away. In such cases the Kirghiz make not only that party responsible who has done the deed, but all his kith and kin as well. They will sometimes drive off a whole herd, sometimes a portion only; thus perhaps 200, 300, or even 500 horses will be removed, for the party of lifters must be a small one which is satisfied with a tenth portion of the drove. In the steppe a renowned master of the art gains by his skill amongst the people the seductive title of *batír* or *bogatír*[1]. When the Russians established themselves in the steppe country *barántas* occurred but seldom, at least not nearly so frequently as formerly. Still in every district the number of horses and cattle generally that are lifted yearly is considerable. The act of *baránta* is unattended with any very cunning preliminaries. Three or four men creep up to a herd, each jump up on a horse, and then with shouts drive off as large a proportion of the herd as they can manage.

---

[1] From 100 to 400 *roubles* (£12-10 to £50).—*Author.*

[2] Or great national sport of Central Asia, see pages 41 and 268-269, Vol. I, Schuyler's Turkistán, for a detailed account thereof.—*Trans.*

If the number of lifters be larger they will mount and approach the drove. But now begins the second and most difficult part of the *baránta, viz.*, the getting away from the inevitable pursuit, since one or other of the care-takers of the drove will have certainly used every endeavour to gallop off to his *aul*, where with wild and piercing shouts of "*atan*" (mount) he will rouse all his neighbours. Every careful householder will keep both day and night, fastened to the door of his *yurta*, one or more saddled horses, an arrangement which admits of the possibility of pursuing robbers very expeditiously. Woe be to the plunderers if they once fall into the hands of the pursuers even if they do not give themselves up an easy prey. A regular fight now begins and the whole arsenal of Kirghiz firearms is brought into play. Several fall on either side, but it must in truth be added that the lifters are but seldom overtaken in the pursuit. The raider will as a rule mount the best horse, leading another by the bridle. During the pursuit, and whilst the pace is a frantic one, he will jump from one animal to the other. This enables him to ease each horse in turn and to thus distance his pursuers who as a general rule have but the one horse to carry them.

It is remarkable what importance the Kirghiz attach to the weight which a horse in flight should carry. If the race be swift and protracted the rider by degrees casts forth everything possessed of the slightest weight. Indeed, sometimes he will throw off his own clothing, his shirt included, leaving but his whip, and this too perhaps he will discard so that he may lighten his horse as much as he possibly can. If the lifted drove be not taken across the frontier line, it rarely happens that the plundered horses escape or the thieves themselves ultimately. Unfortunately the lengthened procedure of the popular tribunal for the trial of the robbers and the award of the Judges (*biĭs*) are very unfair as regards the suffering party.

---

[1] *i.e.* hero.—*Trans.*

On the approach of an early spring the droves of horses are conducted to localities less confined than the autumn and winter quarters. Here the foaling of the mares takes place, and with this season begins the best time for the Kirghiz owner of the drove, for now he can ferment pails-ful of his favourite drink *koumiss*, which indeed at this period of the year constitutes his sole sustenance. The colt or foal remains with its dam not longer than ten days, after which period it is driven from its mother and tied with specially arranged ropes close to the *yurta*. The mares are then driven off in batches, each headed by a stallion. Every such batch is called a *Kosyák*, and the number of mares allotted to each stallion does not exceed 15 or 20.

Three times during the 24 hours the mares are driven to the *yurtas* to be milked, and before each operation the colt or foal is allowed about a couple of minutes with its mother. All the time, however, the Kirghiz is ready to take care that only a few cups of superabundant milk falls to the lot of the suckling. Hence it is that the Kirghiz colt is very thin, and far from having that playful nature so noticeable in the colts of European Russia. The richer Kirghiz sometimes allow the colt to be with its dam during certain hours, principally at night. As soon, however, as the young one is able to munch the grass its moments with its mother are but fleeting, and they are only allowed to prevent the dam running dry altogether. To enable the colt to get any sustenance at all, grass is placed for it near the owner's *yurta*, the surroundings of which afford but scanty herbage, because the surface of the ground is nearly always worn and trodden down.

The colt is ridden at an extraordinarily early age and before its bones are set, *viz*., in the second year. This is no doubt one of the causes of the small size of the Kirghiz horse, the more noticeable from the fact that the mares, which the Kirghiz seldom ride, excel in this respect either the geldings or the entire horses. The Kirghiz maintain, however, that if they did not begin to ride their colts thus early, they would not be approachable at the age of 3 or 4.

During the spring and summer Kirghiz horses become so fat and improve to such a degree as to become unrecognizable.

This is especially the case with horses that are ridden to the mountains. Amongst the Kirghiz who roam on the higher lands the horses are distinguished by their better condition, the beauty of their form, their powers and capability for lengthened journeys. Such animals freely cross terrible and rocky summits, during the progress over which the rider will sit with peculiar skill as though his steed was going over the most even ground, and did not occasion him the very slightest jostling or uneasy movement of any kind. On mountain paths fissures about 2½ feet wide, and even more, are often met with; these are flanked by a yawning precipice whilst the track itself is very narrow. To the Kirghiz horse the obstacle is of the most ordinary description, for he will carry his rider across it with such lightness as scarcely to shake him in the least. The aptitude too with which an animal of the same breed can cross a rapid mountain torrent constitutes a priceless quality of the stock. In defiles and sometimes in valleys such streams are encountered which, though but 2 feet in depth, will carry any man off his legs. These the Kirghiz horse will cross, nay channels of greater depth, even say to 3½ feet, will not stop this surprising animal. For be it remembered the bottom of such streams generally consists of huge smooth boulders over which it is difficult to move, not merely when the velocity of the water has lessened but when the bed is altogether dry.

In consequence then of the light movement of the Kirghiz horse, its indifference as regards any particular food and its unusual powers of endurance—the results of a good constitution and severe training—this animal is simply priceless for rapid movements over desert and waterless steppes where it often happens too that green fodder does not exist. A good Kirghiz horse is so unwearying that 100 *versts* (66⅔ miles) can be traversed daily for six, seven, or even ten days in succession.

Between Peter-Alexander[1] and Kázalinsk[1] there is no post road, correspondence being maintained through the medium of *chabars* (mounted messengers). Kirghiz are hired monthly for the purpose and receive 25 *roubles* (£3-2-6), providing their own horses. They are obliged to carry the post in eight days. By the map the distance between the points named is about 500 *versts* (333⅓ miles), but roads which should go perfectly straight do not exist, hence the nearest way involves at least a distance of 550 *versts* (366⅔ miles). Moreover the Kirghiz seldom adhere to the most direct route, but make long détours for the purpose of visiting the sparsely scattered *auls* in this neighbourhood and their acquaintances, with whom a rest and a good meal await them. Almost the whole of the route in question lies along shifting sands, and on it is a waterless stretch, extending for 130 *versts* (86⅔ miles); and if the fact be taken into consideration that in the well furthest away from the Amu-Daria there is often no water, the whole journey may be held to be a great undertaking. To complete the picture let us add (1) that the Kirghiz horses in question are poor and emaciated in consequence of the extreme poverty of the pasture that they get; (2) that they carry along this steppe not a light but a very large load. Of green fodder along the route indicated there is none, so that it is necessary to carry on and for the horse from 1½ to 2 *puds* (54 to 72 lbs.) of barley besides the necessary food for the rider, the more so because *auls* are not met with in more than two or three places during the journey. In winter too a felt covering must also be carried to put over the horse on coming to a halt, besides a proper store of clothing for the rider to prevent his being frozen on the setting in of a sharp frost or the bursting of a storm. If in addition to all this we further include the rider's fire-arms, the nose-bag, and the vessel for drawing water from the wells, besides numerous smaller articles that are necessary in a desert country, we may boldly affirm that the lighest load on the horse will never be less than 8 *puds* (288 lbs.) It follows, of course, that the *chabars* are sometimes behind time, but such instances are rare, and then the horses are not in fault.

Russian merchants do the same distance in five days and even less, but then, of course, their horses are better, having to carry far greater loads than do those of the mounted messengers of which we have just been speaking. For instance no Russian merchant ever rides a journey without carrying his copper or brass tea-urn (*samovár*), pails, &c., &c. If there be a spare horse there will only be one amongst several men, and the poor animal will be loaded as much as possible.

---

[1] Fortified points on the Amu-Daria and Sir-Daria respectively. Kázalinsk is also known as Fort No. 1.—*Trans.*

Between Khiva and Bokhára, a distance of 450 *versts* (300 miles) the journey is performed in a time not exceeding four days, 200 *versts* (133½ miles) of the route lying over loose sand and very uneven ground that constantly dips and ascends over high sand drifts (*barkháns*). On this route the loads are even heavier than on the one previously described, because here no one can travel without a large supply of water, if we except those occasions on which the journey is performed with fabulous speed, the stock of water being then confined to a small leathern bag (*tursuk*) attached to the saddle bow.

Between Petro-Pavlovsk and the town of Turkistán [1], a distance of 1,500 *versts* (1,000 miles), the agents of the various trading houses, who are for the most part Tatars, ride in three weeks, sometimes a good deal less. Along this route regular supplies of forage can only be reckoned on for about half the distance, *i.e.*, as far as Fort Ulutavskoye [2]. Beyond this point *djuzán* (*polin* or absinthe) alone grows, and even this very sparsely, in places there being no sort of vegetation. To carry corn for such a long journey would not be possible, and so every endeavour is made to travel as lightly as possible. Very curious information as to how a Kirghiz horse behaves under variable circumstances can be found in an interesting article by Mons. Vogak [3].

In the autumm of 1869, during the insurrection on the Orenburgh steppe, a detachment under Mons. Vogak himself, consisting of two Orenburgh *sotnias*, 120 riflemen, mounted on Kirghiz horses, one 3-pounder gun and two rocket stands, traversed in the course of a month about 1,500 *versts* (1,000 miles) and only lost three horses. It must not be forgotten that about half this march lay over deep sand (the Greater Bársuks in the neighbourhood of the Sea of Aral).

The Cossack leader Bobroff, who was in pursuit of some raiders, frequently rode with his Cossacks, from 120 to 150 *versts* (80 to 100 miles) in the 24 hours. They would in many cases return the same distance to the Fort the next day, and on the first rumour of the reappearance of the freebooters would again gallop off in pursuit.

The following is a striking instance of the rapidity with which one or more horsemen can get over a distance of from 150 to 250 *versts* (100 to 166⅔ miles). In May 1869 Mons. Vogak, accompanied by an interpreter and two Kirghiz, rode from Kára-Butak [4] to Irgiz [4], in a direct line 160 *versts* (106⅔ miles), in less than 12 hours. The horses and saddles belonged to Kirghiz and the animals in no way suffered from this rapid ride.

In October of the same year, Mons. Vogak left his detachment to come on by regular marches along the Greater Bársuk sands and rode on to Irgiz, attended by 30 Cossacks as a guard. Half-way he left his escort because he wished to spare their horses that might otherwise have suffered on account of the ceaseless pursuits after freebooters. He himself rode one horse into Irgiz, a distance of 250 *versts* (166⅔ miles) in 34 hours.

---

[1] In the province of Akmolinsk and Sir-Daria respectively.—*Trans.*

[2] This point does not appear on the Russian map of 1877, but Arrowsmith's map gives it. The latter, notwithstanding its small size, may be said to be the *only* good English map of Central Asia in existence.—*Trans.*

[3] Vide *Voyenni Sbornik* No. 9 for 1873.—*Author.*

[4] Both fortified points in the province of Turgai; the latter is also called Fort Ural.—*Trans.*

Rides by the Kirghiz themselves, always on two horses, are still more striking.

For instance, in April 1869 a Kirghiz, who had been sent by Mons. Vogak with a packet of letters from the natural boundary of Aral-Chiï (which lies to the north of the Greater Bársuk sands) returned in 37 hours, having ridden his two horses 400 *versts* (266⅔ miles) in that time. Messengers, sent by Colonel Count Borch, commanding a detachment, from Djebeske, came to Orenburgh in six days and took back an answer in 14 days, during which time they had ridden 900 *versts* (600 miles.)

As another instance of a peculiarly rapid ride I will adduce the following: After the fight on the heights of Chupán-Ata before Sámarkand in 1868 a *jigit* (mounted messenger or sort of militia man) was sent to Táshkand, where he arrived in 24 hours having ridden one horse, a stallion of 4 or 5 years, 280 *versts* (186⅔ miles).[1]

Notwithstanding their strength and power of endurance, Kirghiz horses are nevertheless subject to various ailments occasioned by causes above indicated. Siberian plague, or *yázva,* likewise destroys not a few. The latter disease is cured by one very expeditious method; the horses thus affected are kept standing in water up to the belly for a lengthened period, during which food is only given to them at night, and then heated salt is mixed with it.

Of other diseases the following are the most frequent:—

Parsh, or itch, a disease which is peculiar to steppe horses. It appears as a rule after the winter emaciation. A horse afflicted with it is rubbed over either with tar or salt and kept apart from the drove until the scabs have dried.

Nógot (*ul*), or horny excrescences, which are cured by bleeding the ear. Blood-letting from the several parts of the body is mostly practised by those who do not understand the diseases of the equine race.

Manam, a suspicious looking sort of flux. Besides a discharge of pus from the eyes and nostrils, subcutaneous ulcers not unfrequently show themselves. In the latter case the disease bears the name of *chilchige,* but even if unattended by the latter complication it is held to be incurable, although certain Kirghiz do endeavour to keep up the horse's strength by pouring *koumiss* into its nostrils.

Glanders are likewise treated by pouring *koumiss* into the horse's nostrils and by puncturing the muscles of the breast in various places.

Jamandat is a disease which the Kirghiz hold to be one of the most dangerous. Its signs are tumours in the chest which if they reach the windpipe cause the animal's death. On the appearance of swellings the place is at once lanced, but if after this operation the swelling is seen to extend upwards, further treatment is deemed useless, and the horse is killed and eaten.

---

[1] At the rate of about 7¾ miles per hour.—*Trans.*

It is remarkable that hoof diseases are almost unknown amongst Kirghiz horses. This is, perhaps, explained by the fact that the Kirghiz do not shoe their horses either in the plains or in the mountains. Hence the hoof of a Kirghiz horse is remarkable for its unusual hardness. One of these animals will go for hundreds of *versts* over rocky mountains and valleys covered with pebbles, and yet its hoofs will not be in the least injured. Perhaps it is because of the quality of its hoof that the Kirghiz horse is of such extraordinary value, and really one cannot be surprised at this when one sometimes beholds some Kirghiz valiant, weighing from 7 to 8 *puds* [1], getting his horse to clamber over high rocks forming an angle of 30 degrees and maintaining this incline it may be for several *versts*. We have ourselves happened to see tracks having the appearance of being worn by the passage of chamois or *marál* freely and easily traversed by Kirghiz, who call such "*kára-jol*" or the "highway."

They must have great presence of mind and confidence in their horses to go over places that for the most part lie along a narrow rocky cornice, on the one side of which is the overhanging crag and on the other a precipice. And yet in spite of all this, occasions of misfortune in such passages are of the rarest occurrence. The rider then thoroughly trusts his horse and the best will throw down his reins preferring that his horse and not he should select the proper road.

Kirghiz horse-doctors have from of old been celebrated for their great knowledge and skill in operating on horses, operations which they effect entirely with the aid of an ordinary knife attached to their girdle called a *psiak*.

Many diseases, such as diarrhœa, piles, windgall, &c., the Kirghiz consider so unimportant that they do not treat them at all. The castration of entire horses is carried out in the most negligent manner, in consequence of which the percentage of mortality is a high one. In the operation, which takes place generally at the age of 2, the Kirghiz use only at wist, cinders, and the *psiak* above mentioned. After it is over the animal is driven straight off to join the drove.

Although the sport called *baiga* amongst the Kirghiz is not designed for the trial of the respective qualities of their horses, under a certain stage of the development of the business of horse-breeding, the custom might receive another bent more intelligible and useful. Amongst the Kirghiz the *baiga* is a great affair. The birth of an infant is celebrated by it; in it the memory of a departed relative is honoured; it awaits too the arrival of a distinguished guest. The more important and wealthier the Kirghiz who institutes a *baiga*, the more considerable are the prizes and the larger the number of the competitors. But however modest be its proportions a vast mass of spectators will always come to witness it, perhaps 1,500 or 2,000, and of these the greater part will come from afar, it may be 300 or 400 *versts* (200 to 266⅔ miles). But of course the larger number will only come a long distance when the *baiga* is a rich one, *i.e.*, when the number invited is a large one and the prizes numerous and of value. On the occasion of a grand gathering the value of these prizes will sometimes amount to several thousand roubles[1].

---

[1] This, and indeed the whole statement, must be exaggerated, for since a *pud* equals 36 English lbs the author would have us believe that the "valiant" spoken of weighs from 18 to 20 stones.—*Trans.*

In the training of a horse for a *baiga*, the Kirghiz hold that the animal should be relieved of all superfluous *internal* fat that otherwise would press on the lungs and hinder the free breathing of the animal. They at the same time endeavour to make the whole body of the horse lighter and to give it a greater amount of strength.

Amongst the Kirghiz, as everywhere else, the training of a horse for racing consists in trying its paces and regulating its food: but this process with them is otherwise and more simply conducted than on the flat. The preparation of a horse for the *baiga* begins about two months and never less than four weeks beforehand. The longer the distance to be run over the more protracted is the period of the horse's training. But some Kirghiz are of opinion that the horse is ready to take part in the trial when its sweat loses its salt taste and becomes like water.

Baigas as a rule take place during the summer or winter, prior to which the horse ceases to be let out to graze and is given from one to two wooden cupfuls of barley (weighing about a *garnets*=0·34 peck). With this allowance it gets at first a little dry grass, the amount of which is reduced little by little, and altogether stops within a period of from four to five days of the great event. The horse is now fastened to a long cord stretched between two stakes in such a way that though it can move freely from one stake to the other it cannot munch any grass. The fastening is always made where there is grass, so that the animal in its desire to get it shall always keep on the move. Endeavour is made also to deprive the horse of water, and as a substitute they give it the fresh or the fermented milk of the mare. At first the poor beast will not take it, but at last its thirst is so great that it accepts readily, whereupon its Kirghiz master looks the more eagerly for success in the race.

In the opinion of the Kirghiz the horse acquires through the medium of the milk that strength without which they could not take it to the course, because the distance to be traversed is great, extending sometimes to 80 *versts* (53⅓ miles). The riders are generally small boys of not more than 10 or 12. There are some remarkably good riders too amongst them, who would do honour to any European race-course. These Kirghiz striplings are in no way trained, and when they get down from the horse after a gallop of some 50 *versts* (33⅓ miles), they do it as jauntily as though they had not ridden more than ½ *verst* (⅙ mile)[2]. Prior to the commencement of the race, all the horses competing are collected at a given point where a large concourse of Kirghiz awaits them. The horses have to reach a given point and then race back. During the race to the place indicated, umpires attend the competitors, and it is their business to see that each one fails not to go up to that point and to traverse exactly the same distance as the others. High ground is usually selected for the judges' box, whence a good and extensive view can be gained of the road leading back to the goal. When it is thought that the competing horses are on their way back to the goal or prize-stake, there go forth those interested in the race, several men devoting themselves to each of the running horses which they rush to drag in, in case it may grow weak just as it draws near to the goal. As they await the return of the horses from the *baiga*, the Kirghiz have lotteries amongst themselves, each prize consisting as a rule of an *arshin* (28 inches) of chintz. At last a cloud of dust appears in the distance, the crowd gets thicker, and several horses are seen coming up at a fast gallop. Those Kirghiz who are nearest to the course rush forward to their respective favourites, and seizing them by the tail and mane begin to drag them forward, thus trying to make the jaded animals move, if possible, the faster. The leader is mercilessly beaten by his backers, until at last he reaches the goal amidst a perfect throng of Kirghiz. Of course under such circumstances the conscientious judges find it difficult to decide in what order the horses have arrived, and hence, in the awarding of the prizes, a most frightful wrangle generally ensues, which often ends in blows. One of the principal reasons for appointing a long distance for the *baiga* is that the horses may not come up to the goal at one and the same time, for the longer the course the easier is it to determine the order of the competing horses.

---

[1] Thus at one of these *baigas* which we attended the first prize consisted of 100 camels, 100 horses, 100 cows, 100 sheep, 100 *roubles* (£12·10), 100 *kokandis* (about £2·5), 100 *arshins* cloth, 100 *arshins* of a material called *shai* or *kanaus*, and 100 pieces of *máta*.

The second prize is usually of considerably less value and may consist of two or three horses. Such an infinite difference between the first and second awards induces all to struggle for supremacy.—*Author*.

[2] These boys always race without caps, the head being fastened round with a cloth, bound very tightly. At first the pace is not severe, an easy gallop or perhaps a trot, but on returning towards the goal, they let their horse out, especially as it draws near.—*Author*.

When the *baiga* is over the horses are unsaddled and unbridled. Any animal that is to take part in another race is given a little grass during the space of two or three days to make it fresh, and then it again undergoes the training that we have described above. In any case, after a race of unusual length, the horse is kept standing without food or drink for at least 24 hours, and if it be very tired even more, for the Kirghiz are convinced that the best way of bringing a horse round after excessive work is a lengthened period in the standing position. Even after an ordinary quiet ride of 10 or 12 *versts* (6⅔ to 8 miles), a Kirghiz will make his horse stand for at least 10 or 12 hours, principally at night.

The Kirghiz never trot their horses on the steppe, the invariable pace being a quick firm pace which enables the horse to move at the rate of from 6 to 7 *versts* (4 to 4⅔ miles) per hour. Hence a Kirghiz horse is never tired by a ride of from 20 to even 30 *versts* (13⅓ to 20 miles). Nevertheless a very lengthened stand is in such instances considered necessary.

Regarding the swiftness of the stride of Kirghiz horses we will here give some details borrowed from an article by Mons. Garder in the *Voyenni Sbornik* for 1875.

Amongst the Inner Kirghiz Horde races for prizes were instituted by the Minister of State Domains beginning with the year 1851. On the $\frac{\text{22nd September}}{\text{4th October}}$ of the same year a circular course, measuring 6 *versts* (4 miles), was made, and round this the horses had to go five times. The horse which carried off the prize did the 30 *versts's* (20 miles) distance in 48 minutes and 45 seconds, giving an average of 1 minute 37 seconds to a *verst* (⅔ mile).

Commencing with 1853 the races were held thrice, twice and once a year respectively, but always over a circular course, measuring 20 *versts* (13⅓ miles). Of these races we have only detailed information from the year 1869.

The greatest speed was recorded on $\frac{\text{20th September}}{\text{2nd October}}$ 1853, when the horse which took the prize did the 20 *versts* (13⅓ miles) in 27 minutes and 30 seconds, or one *verst* in 1 minute and 22 seconds.

The lowest rate of speed, on the other hand, was displayed on the $\frac{\text{18th}}{\text{30th}}$ May, *viz.*, 20 *versts* (13⅓ miles), in 39 minutes and 30 seconds, or one *verst* in 1 minute and 58 seconds.

The Chief Administration of the State Studs did not credit the information sent from the Horde, so that in 1856 there was sent to the sitting committee a second metre, requesting that the speed might be followed on it, the circumference of the circle having been previously measured. The President of the committee reported that the measurement of the course was correct, except that in every 4 *versts* (2⅔ miles) it was out 17½ feet. The deficiency was then made good. Accordingly on the $\frac{\text{20th September}}{\text{2nd October}}$, a trial was held at which the speed was checked with the aid of the second metre that had been forwarded and several watches with second hands. These showed a speed of 20 *versts* (13⅓ miles) in 31 minutes, or 1 *verst* (⅔ miles) in 1 minute and 33 seconds.

All the races over a course of 20 *versts* (13⅓ miles), of which we have particulars, number 19. The average time in which the Kirghiz racers got over this distance was 33 minutes and 40 seconds, or one *verst* (⅔ mile) in 1 minute and 41 seconds.

In 1861 a race was held over another circular course measuring about 3½ miles. Round this the race was five times. The mare that won performed the distance (about 17½ miles) in 48 minutes and 45 seconds, or ⅔ mile in 1 minute and 51 seconds.

On $\frac{\text{26th September}}{\text{8th October}}$ 1863 the descendants of Khán Jehángir constructed a circular course on their estate on the river Torguna, which measured about 23 *versts* (about 15⅓ miles). This course still exists and is marked with a ditch and bank. The distance over this was performed in 42 minutes and 20 seconds, or one *verst* (⅔ mile) in 1 minute and 50 seconds.

For the race of $\frac{\text{21st May}}{\text{2nd June}}$ 1861 they weighed the riders and found that their weights ranged between four and six stones.

Races over a circular course of more than 20 *versts* (13⅓ miles) have not taken place. In the Kálmak *uluses* (groups of nomad tents) of the Astrakhán Government, races over 15 *versts* (10 miles) have been held.

The greatest speed over this distance was recorded in 1864, *viz.*, 23 minutes and 56 seconds, or one *verst* (⅔ mile) in 1 minute and 35 seconds.

The lowest rate of speed over the same course was in 1864, *viz.*, 27 minutes, or 1 *verst* (⅔ mile) in 1 minute and 48 seconds.

The time recorded between 1862 and 1865 and 1867 and 1869 was 25 minutes and 15 seconds, or 1 *verst* (⅔ mile) in 1 minute and 41 seconds.

It is not possible to compare a 15-*verst* (10-mile) course with a 20-*verst* (13⅓-mile) course, because the pace throughout, and especially towards the end, is different. But even if we were to essay such a comparison, the pre-eminence would be with the Kirghiz horses, since the highest rate of speed of the latter animals was 1 minute and 22 seconds, and of the Kálmak horse, 1 minute and 35 seconds, whilst the lowest rate of speed of the former was inferior to that of the latter, the figures being as follows: 1 minute and 58 seconds and 1 minute 41 seconds respectively. Their averages are thus shown: Kirghiz, 1 minute and 41 seconds; Kálmak, 1 minute and 41½ seconds.

Russia as regards her supply of horses, is remarkably well off. The southern steppes of New Russia were at one time more productive of horse-flesh, so that our cavalry never wanted remounts of the best kinds. But now, unfortunately, the once inexhaustible supply of horses has begun to run dry and that at a very rapid rate.

It would be worthwhile to trace these particulars out for the last 10 or 12 years when the swift economic development of Russia made it almost impossible to breed such a noble, and in some cases ignoble, animal as the horse, in the sense that is of a regular and well-considered item of rural industry. The development of railroads has had a still more destructive influence on the breed of Russian horses, as, apart from the fact that the iron road diverts all the economic forces to other more favourable localities, it, by its very property, renders the horse unnecessary as a motive agent, and hence the demand for horses lessens with the increase to the number of railroads, so that the breeding of this useful animal cannot but be restricted.

It is known that in Russia studs have never been paying concerns, at least the exceptions have been very rare. Prior to the emancipation of the serfs a stud-owner had at his command a large number of unpaid employés, but even then horse-breeding was almost the same exclusive passion (though perhaps a more noble one) as the fancy for keeping up packs of sporting dogs. In any case economy scarcely ever entered into the question of horse-breeding. The most prosperous studs were those which were made the medium for the sale of all its produce, including oats and hay, the market for which was in certain localities almost closed; and since these articles were the products of enforced labour, the stud-owner when he sold his horses sold with them the unpaid labour of his own peasants. In such a case any price was advantageous to the owner which he might receive and even that which he got for supplying cavalry remounts. The question he kept before himself was how to produce the largest number of horses and to make their number indemnify him for the smallest expenditure. But besides all this a stud requires a number of employés to take care of the horses, and an owner could have as many as he pleased, of course without paying any of them anything. Now-a-days cheap production of remounts is in Russia almost an illusion, and this because now every, even the most infinitesimal labour, must be paid for. Stud servants are moreover very expensive to maintain, so that if we calculate all the items of expenditure in a stud and divide these by the number of four-year olds got ready for the market, we shall find that each horse will cost the breeder not less than 300 *roubles* (£37-10) *i.e.*, if we leave out of the account rejected and under-sized animals, which are sold for a trifling sum. The remount price for the horses of the Russian Cavalry of the Guard (Cuirassier regiments excepted) has been fixed at 203 *roubles* (£25-7-6), and for those of the Cavalry of the Line at 125 *roubles*[1] (£15-12-6). These prices include the bringing the remounts from the stud to the particular regiment, an arrangement which must involve a very considerable sum. Thus many of the remounts for the Russian Cavalry of the Guard have to be brought from the south of Little Russia to St. Petersburgh. For the railway alone from Moscow to St. Petersburgh the charge is 16 *roubles* (£2 per head). Although the original price paid for the remounts of the Russian Cavalry of the Line is not nearly so high, being almost half, expenses attending transport cannot but be very considerable. These questions then come to be asked—How much is the most conscientious remount agent able to pay the breeder? Can he give him any percentage at all in return for his wasted capital, and can he reimburse him for one such loss? From this we shall see that the condition of studs in Russia has become a very difficult one, and that in spite of all the encouraging measures of the Chief Administration for State horse-breeding, this important branch of state economy can scarcely be maintained.

It was only in 1864, at the Ilin fair held in the town of Poltáva, that the late General Aide-de-Camp Grinwald expressed himself in a statement of remarkable truth concerning the southern regions of Russia that were at one time so rich in horses, to the effect that "the sheep is everywhere driving out the horse." We must not forget that this remark applied to a time when communications were far from having the development that they now have, and consequently many other productive agencies had not received the tendency that subsequent events have perforce given them. So it has now come to pass that horse-breeding is only practicable for wealthy folk, an *article de luxe*, a destructive passion or hobby. In our day then there are not many fanciers who can make up their minds to sacrifice hard-gotten gains out of love of horse-flesh. The breeding of trotters and racers (thoroughbreds) is subject to the same conditions; but we are here speaking solely of the remount class of horse.

In truth we still have in Russia a vast source of supply for our cavalry remounts, *viz.*, the country of the Don, which, were the question taken up, could in the not distant future be made capable of producing a cheap breed of horse for the purpose in question. But we have indeed full ground for the belief that the Don will soon in this respect share the fate of Southern Russia, and that in this tract horse-breeding will on an early date be driven out by all other branches of rural industry.

In view then of such a state of affairs for Russia there still remains a vast source of supply for her cavalry remounts, *viz.*, the Kirghiz steppe.

Kirghiz horses need not be subjected to trials before being admitted into the Russian army, because an honoured place therein belongs to them of right and this they will assume of themselves. We should not forget that on these horses Kokand, Bokhára, and Khiva have been subdued and pacified. On them served throughout Central Asia our cavalry, our artillery, our officials and our officers: that not one single movement has taken place in the same country without preliminary information brought on these horses travelling on some occasions a distance of 200 *versts* (133½ miles) in the 24 hours: that, finally, all the hard fought campaigns which have gained for Russia sovereignty in Central Asia have been carried out, without exception, with the aid of these horses.

---

[1] The Cavalry of the Guard, His Majesty's Horse, and Cuirassier regiments, have horses priced at 235 *roubles* (£27-7-6). The Empress's Cuirassiers are mounted for 207 *roubles* (£25-17-6) per man and all the other Guard regiments for 203 *roubles* (£25-7-6). The price fixed for the Cavalry of the Line, *viz.*, 125 *roubles* (£15-12-6), has only obtained of late. Formerly it was from 60 to 85 *roubles* (£7-10 to £ 10-12-6) according to the distance of the depôt from the place of sale, &c.—*Author.*

If Kirghiz horses are suitable for cavalry they are not the less so for artillery, since they are both light and compact, broad of beam, very skilful and well adapted for purposes of heavy draught. So for artillery, and especially for the horse branch of that arm, which should in war time be the very shadow of the cavalry, heavy horses are decidedly unfit, those being required which with unweariedness and lightness of movement is coupled considerable power of draught. It may be permitted us to remark that Kirghiz horses can be said to be the very ideal of artillery remounts, especially if we add that they are quiet, very intelligent, and soon grow accustomed to firing of all kinds.

Kirghiz horses too would be specially useful in bringing up cavalry and artillery remounts to a war scale.

And animals of this breed would moreover involve another advantage, *viz.*, a large and ready supply of trained animals and of animals so well trained that any indifferent rider could, when mounted thereon, execute evolutions in the capacity of only a few and those the most skilful riders of the present horses of the Russian regular cavalry. Every good horse which a Kirghiz rides is surprisingly skilful, active, teachable, and obedient. This being the case horses of this breed could at once be passed into the ranks of cavalry on active service, an advantage of which the adoption of no other breed of horse will put us in possession.

In proportion as buying of such horses were carried on, the prices demanded for them by Kirghiz nomads would no doubt rise, but the supply of such would not fail, because without saddle-horses the Kirghiz cannot continue their nomad style of living.

Thus these nomads would in time of war render us service of no slight importance, thus unconsciously taking upon themselves the performance of the rôle of reserve squadrons, from which, under present circumstances and even in peace-time, horses after a period of more than ten months pass into different regiments in the shape of stupid, coarse, intractible animals, in a word thoroughly unbroken steeds. These the best riders of a regiment, under a non-commissioned officer, are engaged in breaking in during a whole winter, and though this is the case even at the beginning of the third year of their service they are still called young or recently received horses, from which regular and masterly exercise cannot be required.

There is one other good quality which incontestably belongs to Kirghiz horses, and one that has been observed by many of those persons who have had to do with this breed of horse. This is, that when wild or afraid of the presence of man they are obstinate, strain at the rein in their endeavours to push forward, and during these attempts although they may fall, they scarcely ever kick. So from all that we have said it is clear that there is no sort of obstacle in the way of admitting Kirghiz horses into our cavalry and artillery services, the more so because of their superiority over horses used in both these arms at the present day, Kirghiz horses being at once cheaper, incomparably more enduring and stronger, possessed of excellent paces, a quality so rarely met with in European horses. They would serve too longer because they are much more docile. All these superiorities Kirghiz horses possess not only over the present Russian remounts, but over all other steppe breeds yet introduced into the Russian army.

We will hope then that animals of this breed which have rendered such service to our armies will at length draw to themselves just attention, and interest other than mere fanciers. We have shown that in the event of war Kirghiz horses would be of great service to the State because the Kirghiz studs, as sources of supply, present such advantages as could not possibly be expected of the studs and droves of European Russia. The sole defect of the Kirghiz horse, its small size, could be easily removed in the first generation by crossing the breed with a larger one possessed of like properties, or, as they say in horse-breeding parlance, by adding a good strain. This is the reason why the establishment of studs in Turkistán is so desirable.

On the basis of what has been said, the endeavours of the Turkistán Administration have been directed to co-operating in the improvement of native horse-breeding. To this end, in 1871 a stud was established at Kaplán-Bek, 25 *versts* (16⅔ miles) from Táshkand, near the Chimkand road.

This stud was started by a Company aided by the State.

The following was its condition in 1876 :—

Covering stallions	17
1873 Entire horses not used for covering	43
1874 „ „ „	36
1875 „ „ „	31
From Kokand stallions, 1874	1
„ 1875	3
	131
Geldings	23
TOTAL	154
Brood Mares	139
Mares not used for breeding, 1872	4
„ „ 1873	33
„ „ 1874	29
„ „ 1875	25
Rejected	7
TOTAL	237
FROM KOKAND—	
Mares, old, but fit for breeding	8
„ „ 1873	5
„ „ 1874	5
„ „ 1875	2
TOTAL	257

The mares for the stud were bought of Kára-Kirghiz in the Aulic-Ata district, animals from this district being considered the best of the Kirghiz breeds. There is not a doubt that this stock has sprung from known Torgout horses, as the Kára-Kirghiz have long had near relations (peaceful and hostile) with the Torgouts.

There are but few valuable and good horses in Táshkand. Here a horse exceeding 200 *roubles* (£25) in value is a rarity, and can only be got by accident or the medium of jobbers. In the bazaars horses above the value of from 40 to 80 *roubles* (£5 to £10) are not sold. The best horses come from Sámarkand, Ura-Tabe, Bokhára, Kokand, and the Aulie-Ata district. Fair animals too come from Sairám, the town of Aulie-Ata, and other places. The prices of horses vary not only in respect of particular localities, but even in one and the same place according to the time of year and other causes. But the time of year has most to say to these fluctuations, when forage is wanting or at least when it is very dear, as in winter and spring prices fall to rise again in summer and the autmun. In Táshkand a good horse may be bought for from 40 to 50 *roubles* (£5 to £6-5): in Kokand for from 35 to 40 *roubles* (£4-7-6 to £5).

A Kirghiz horse is priced at about 50 *roubles* (£6-5). Amblers are an exception, their prices on the steppe being high.

The most ordinary price of an ambler will be 100 *roubles* (£12-10), and sometimes it will be as much as from 300 to 400 *roubles* (£37-10 to £50).

The dearest horse of all is the Turkmán or *Argamák.*

The lowest price for this breed will be 200 *roubles* (£25), but 300, 400, and 450 *roubles* (£37-10, £50, and £ 56-5) is a common demand. But for the reason given in the beginning of this chapter the number of Turkmán horses in Turkistán is very limited.

CHAPTER IX.

TRANSPORT.

(Camels and their importance in a military-economic sense.)

Importance of camels to the natives and to the Russian troops—Investigation of the methods of obtaining them for military purposes during a campaign—Question as to a permanent camel-train kept up for army purposes—Lieutenant-General Ivanin's opinion on this subject—Permanent camel-train with the French Army in Algeria—Impossibility of maintaining a permanent system of transport with the Russian forces in Turkistán—Various methods for the supply of camels for the Russian troops during steppe campaigns and the rates chargeable for such—Breed of camels in Turkistán—Camel breeding amongst the natives—Descriptions of camels—Diseases of camels and their treatment—Camel's flesh and milk—Prices of camels.

In Turkistán camels have a great importance, both with respect to the native inhabitants and the Russian troops. Amongst the nomads the same animal serves as a trustworthy medium of transport in all peregrinations, during which every article in domestic use is packed thereon. Camel's flesh, too, however tough it may be, is used for food. The hair of the same useful beast is used in the preparation of *Armyáchina,* felts, in place of wadding or the quilted lining of coverlets, and in the manufacture of lassoes and cords of every kind. The settled inhabitants could not get on without camels for the transport of their wares over long distances along waterless and infertile wastes. It has long been the custom in Central Asia for trade caravans to be furnished with camel carriage, and this the settlers mostly get from the nomad races.

Finally, for the Russian forces the camel for steppe campaigns cannot be replaced. The character of all Central-Asian wars demands that, prior to the commencement of military operations, there shall have been collecting (for several months beforehand) a large stock of camels, for at the theatre of war the process cannot be carried on either by purchase or by seizure. A vast system of transport is indispensable, and the machinery for the inauguration of such cannot be set in motion at the last hour. Experience of many years has shown that this transport must consist of camels. During the Khivan campaign of 1839-40 more than 10,000 camels were procured for the Russian detachment at 10 *roubles* (£1-5) apiece. For the Khivan expedition of 1873, 8,800 camels were equipped for the Turkistán detachment alone, and to these another thousand had soon to be added. The Kizil-Kum Kirghiz furnished most of these animals; but some hundreds were sent by the Amir of Bukhára.

Experience of steppe campaigns in Turkistán has moreover placed it beyond doubt that the best method of equipping the operating force with camels is by contract. The military authorities arrange with the contractors that they shall convey the required quantity of stores, &c., for the troops to a given point for a stipulated sum.

A well-known military writer, the late Lieutenant-General Ivanin, proposed in 1873 that a permanent camel-train should be established in the Turkistán military circle on the same basis as those existing in Algeria and in India.

The necessity for a permanent camel-train, in General Ivanin's opinion, lies in the fact that for a war a large quantity of camels is at once required, to collect which speedily is difficult; and even were this to be done in good time the secret of the campaign becomes divulged and the enemy placed in possession of the objects in view. Besides this, according to Mons. Ivanin, with a large complement of camels a considerable number of drivers is momentarily required, and the getting together of such men is a difficult operation, the troops knowing nothing whatever about lading and unlading the animals served out to them. The existence of a permanent camel-train, and a proper number of *lautchis* or drivers always at hand, would insure the speedy acquaintance on the part of the troops with the habits of their transport animals.

General Ivanin himself recognised the high cost of maintaining a permanent camel-train, and he therefore proposed to keep up in time of peace the nucleus only of such a means of transport, making up the rest according to the measure of the judged necessity before the outbreak of the particular war.

Lieutenant-General Ivanin's memorandum was forwarded to a Military Scientific Committee of the General Staff of the Turkistán Military Circle, and was reported upon by that Committee in the year 1873. The Committee almost unanimously decided against the fitness of a permanent camel-train for Turkistán, even on the cadre system, and this because the maintenance thereof would prove too costly, whilst in war-time it would still be necessary to search in every direction for the greater number of animals required. Consequently the deficiency would still to a considerable extent have to be made good, and the having to place the train on a war footing on the outbreak of a campaign would not be avoided. In Turkistán the theatre of warlike operations is extremely diversified in respect of locality, *i.e.*, whether on the steppe, in populated districts, or in the mountains. In the first contingency camel-carriage exclusively would be necessary; in the second the native *arbas* or carts with harnessed horses might be utilised; whilst in the third instance pack horses alone could be made use of.

In Algeria, especially in the most advanced point to the south, Laghouat, a permanent camel-train of 500 animals with a complement of drivers, is maintained. This train is in constant readiness to start with the flying column (comprising one battalion of Zouaves, one of Turcos, one squadron of Chasseurs d'Afrique, one squadron of *Spáhis*, with two guns), which forms the moveable strength of the Laghouat garrison.

The French have occupied Laghouat since 1852, and their further progress into the depths of the Sahára is not apparently within the near future. The operations of the Laghouat flying column are confined to quelling insurrections amongst the nomad Arabs, and for such a purpose unusually rapid movements are necessary. Owing to the poverty of these Arabs no very powerful military machinery is needed, so that 500 camels amply suffice for the wants of the operating column. Indeed its operations more partake of the character of a simple chase[1].

The Russian position in Central Asia must, however, be regarded in quite another light. Russian troops have there to fight with the ruling Kháns who often possess both organised troops and artillery. Russian detachments must, therefore, be of much greater strength than those French columns of which we have just been speaking. They must in fact comprise from 3 to 5,000 men, and for such bodies a train of pack animals, made up of several thousands, is required. The above are the grounds on which the idea of establishing a permanent camel-train in Turkistán has been completely abandoned.

---

[1] In the numbers of the "Army and Navy Magazine" for December 1881 and January 1882 will be found my translation, entitled the "French Permanent Camel-train in Algeria," forming an English version of a portion of the report on Algeria by the Russian Colonel A. N. Kuropátkin.—*Trans.*

A much more important matter for the Russian forces in Turkistán lies in the settling of the question as to how to obtain camels when war breaks out. Prior to the date of the Khivan expedition, this was always done by bringing the requisition system into play in all steppe campaigns. The camels so obtained were paid for at so much per head at rates that were determined by the Local Administration. With the camels the natives were expected to provide a certain number of drivers, *viz.*, one man for every seven camels. But the system was not altogether advantageous. In the first place the natives brought out their worst and weakest camels, and these animals could by no means be made to carry the regulation loads[1]; hence every calculation as to the hiring of a given number of camels is upset; secondly, the drivers who present themselves are selected by the natives themselves from amongst the poorest of their numbers, persons who never owned a camel, and therefore without the knowledge as to how to deal with this animal, and without the slightest interest in the preservation of the physical strength of the beasts entrusted to them. To a driver of this class it becomes quite the same thing whether the camel in his charge is fed and watered on arriving in camp or not. He is not disquieted if a badly adjusted load cuts into the flanks of his beast, and if the barrel of his camel becomes hide-bound and it may be actually lacerated he is not concerned. But nevertheless a badly fitting load, and one of unequal weight on either side, rolls more about and therefore harasses the camel, which is then prematurely deprived of its carrying power. To such a custodian it matters not whether the animal continues to live, or whether it sinks down from sheer weakness to die on the road. Nay, he is even the better pleased if the latter contingency occurs, because then the circle of his obligations grows limited. The maintenance of, and the supervision over, the drivers too are matters of extraordinary difficulty. These men must be fed, so provisions have to be carried for them. This duty entails a considerable addition to the already huge amount of military stores. It is not possible to pay the drivers in kind when a like practice is not resorted to in the case of the troops. Moreover on the steppe it is often quite impossible to buy provisions for money, whatever be the amount. The drivers comprise a disorderly set, of great numerical strength, possessed of no discipline, ready to desert at any moment, prone to plunder, and a source of demoralization to the troops themselves. In the expedition of 1839-40 under General Perovski, there were with the detachment, numbering 3,000 men, 2,000 drivers, who immediately they got to the steppe took to flight. The General was therefore obliged to shoot two of the number who were caught. Desertion was thus stopped, but the worry with these men continued and to such a degree that the detachment became, so to speak, an escort for its own camel-drivers.

---

[1] In the case of trade caravans the load is a fixed one, amounting to 16 *puds* (576 lbs), or for the one-humped Khivan camel (*nar* or dromedary) as much as 18 *puds* (648 lbs). During the movements of troops, owing to the difficulty of regulating the rate of progress of *all* the pack-animals, and to the fact that camels get sooner tired when so employed than when used to carry merchandise, the several loads are reduced to a uniform weight of 12 *puds* (432 lbs).—*Author.*

In like manner to the Turkistán detachment in the Khivan expedition of 1873, the camel-drivers gave not a little trouble. When this detachment started on the campaign it was accompanied by 1,250 drivers. Their condition was indeed unenviable, each man received 15 *kopaikas* (4½*d.*) and 1 ℔ flour *per diem*, but with the money they could do nothing, whilst to cook *chapáthis* with the flour was a difficult operation. The further the detachment advanced into the expanse of the Kizil-Kum sands the desertion of the drivers became more and more frequent, and as the deserters took their camels with them, several head being sometimes carried off by one man, it needs scarcely be said how much the drivers added to the difficulties experienced in the progress of the detachment. With the Orenburgh detachment in the same expedition it was altogether different. Transport consisting of pack camels was furnished to it by the contractor, Miyakinkoff. These animals were healthy and strong. The owner went with his beasts and was interested in their well-being.

This detachment therefore experienced neither loss of camels nor desertion of drivers. The cost of its carriage was of course considerably higher, because the contract system is much more expensive than the supply of camels by requisition. But, on the other hand, in military undertakings economy should be quite a secondary consideration. When this rule is not practised the object of the expedition is exposed to risk and may even result in greater pecuniary loss.

From experience gained in the way we have just stated, in the future steppe campaigns of Russia the supply of pack-animals by contract will no doubt be sought.

Looking to the importance of camels in the economic life of the natives of Turkistán, I consider it necessary to here insert some information regarding the breeding, treatment and care of this animal.

In Turkistán there are two species of camel, *viz.*, the two-humped (*tuya*) and the one-humped or dromedary[1] (*nar-tuya*), the former being much the more commonly met with.

The one-humped species endures the frosts with difficulty, and is therefore confined to the more southern localities. The crossing of the two breeds gives results, and the Kirghiz avail themselves of the fruition to improve the hybrids so obtained.

The coupling of camels usually takes place during the winter, and the male animal begins to show signs of getting *mast* during the months of December and January. At such a time he becomes restless, eats but little food, and rapidly deteriorates in appearance. He refuses water, becomes furious, cries out, attemps to bite any passer-by or even his master, and runs about the herd with an infuriated look, glistening eyes, and with foam about the mouth. The exasperation of the animal increases more and more in consequence of his unaided efforts to attain his desires, but such attempts are fruitless and unsuccessful unless man comes to his assistance.

This assistance is not afforded before the month of February for the following reason. The female carries her young about a year and sometimes 11 months, but in most cases she goes for thirteen months.

---

[1] In Mongolia the species of the camel is almost entirely confined to the two-humped (Prjeválski's "Mongolia"); in North Africa, on the other hand, the one-humped animal prevails.—*Author.*

Consequently, were the newly-born suckling to be thrown before the setting in of the spring season, it would have to experience a severe winter, and be exposed to destruction from the cold.

Its appearance is therefore delayed until the month of March, and even then on the steppe it is very cold. In order to protect the little one it is carefully wrapped up in felt, space being left for its head and neck; at night it is taken into the owner's *yurta*, and for a month it is shown to no one from the dread lest some passer-by should cast thereon his evil eye, and so bewitch the suckling.

During the first three or four weeks the young camel (in Kirghiz *bata*) is borne in the hand to its mother to suckle, and this because it is only after the lapse of some time that the suckling obtains the power of standing on its long and slim legs. For two or three months of the summer it is allowed to be with its mother, who does not cease to suckle it for a whole year. Meanwhile the young one is taught to nibble the grass, and to this kind of food it adapts itself more and more, although it still obtains milk from its mother for one and sometimes a second year.

After a year, by which time the young camel has become strong, its nostrils are bored, and through the hole thus made is inserted a smoothly cut piece of bone or stick (*burun duk*), to which a cord is then attached, and by this the animal is guided. The bone or stick is never taken out, so that the camel carries it for life. On the march the nose cord of the rear camel is fastened to the saddle (*chom*) of the animal in front. In this way the whole file of camels forms, as it were, one long string. For this file or string but one driver is required, and he guides the whole from his seat on the camel in front of all. Should he be mounted on a horse or mule he drags the leading camel by a cord. But as a rule his seat is on a saddle placed between a camel's humps, and his way of guiding the beast under him is by kicks or the use of a whip.

The young camel having been fitted with a nose-cord is taught to sit down on hearing the sound *chok*, and to rise on the word *chu*, the cord being lowered or raised according to the movement required of the animal in training. These constitute the first necessary exercises, because all the subsequent lading of the animal takes place whilst it is sitting on the ground.

Sometimes during the first autumn the young camel is made to carry a small load, but this is put on more as an amusement, and as a preliminary to future service. The second year the trifling weight is sensibly increased, and during the third the young camel sometimes carries a weight of 10 *puds* (360 lbs). On attaining the age of 5, the camel is held to be full grown; in other words fit to carry a load of from 16 to 18 *puds* (546 to 648 lbs). Up to the age of 15 the camel is possessed of full powers, it then begins to weaken and rarely reaches the age of 25, its early death being brought on through hard work and bad treatment. Without such hard work a camel has reached the age of 40 or even 45. The camel was introduced into Central Asia by the Arabs, and amongst the Turkistán nomads has been brought to a condition of surprising obedience. When in pain this docile animal utters only a plaintive cry and betrays no signs of temper. All camels are taught to come to the watering place on the word *sorrop*, which in Arabic is expressed by *diráb.* A camel with a full load moves at the rate of about 3¾ *versts* (2¾ miles) per hour, but if the load be reduced the above pace is increased to 4½ or even 5 *versts* (3 to 3⅓ miles) in the same time. The trot of the camel enables the animal to cover 10 *versts* (6⅔ miles)[1] within the hour. Its gallop is fairly rapid, but all its movements, except the walking pace and the amble, are very shaking and uneven. Young camels scarcely yield to horses in the quickness of their gallop. Kirghiz often harness this animal to their carts, the shafts of which are attached to cords fastened to the foremost hump. When so made use of the camel will draw a weight of 20 *puds* (720 lbs), and this as an ordinary rule. The weight is by this method still thrown on the back. When harnessed to a properly constructed cart a camel can easily draw from 50 to 60 *puds* (1,800 to 2,160 lbs) weight. In the course of nomad wanderings the greatest distance that a camel is required to traverse in the 24 hours is 50 *versts* (33½ miles). When used with caravans from 35 to 40 *versts* (23⅓ to 26⅔ miles) is the length of the average stage. The ordinary Kirghiz summer move or *kotch* amounts to 25 *versts* (16⅔ miles).

After the completion of each march camels are made to lie down, their loads are then removed, the animal remaining in a sitting posture for from 1½ to 2 hours, after which they are taken out to graze. But this procedure only obtains when camels are used with caravans. During ordinary nomad peregrinations on account of the lesser distances covered and the much lighter loads, an hour suffices for unloading and taking out to water and to graze. But, however heavy be the load and however protracted the march, the period of rest allowed to caravan camels never exceeds two hours and this because the interval between the completion of the march and night-fall is but a short one, and because a camel eats only during the day. This animal eats very quickly and is satiated within a space of from two to three hours. At night camels are not left out on the grazing ground, but are brought to the *yurtas* or encampments, and there huddled together. During winter moves great care is required on the part of those in charge of camels, because the camel cannot rest where there is snow. In such cases the ground must be thoroughly swept and cleared beforehand, otherwise the heavy perspiration which exudes from this animal would quickly cause it to catch cold. Moreover the moisture generated by this exudation would, after cooling, freeze the animal's hair and fasten it to the earth from which it would be difficult to disconnect it.

At daybreak, and before being laden, the camel is once more taken out to graze for an hour, a period that completely suffices to satisfy the animal's stomach for the entire day. It is necessary to observe, however, that this repletion still admits of the constant nibbling of the animal at any chance forage met with on the road. There is scarcely another animal that is less fastidious, both as regards its food and drink. Apparently the camel will eat only the coarsest grasses that are quite unfit for the food of any other animal. *Polin* (*juzán*), reeds, *kuga*, sedge-grass, thorns, *chiĭ* (steppe-grass), all plants, in fact, unfit for horses' food, furnish the camel with dainty and unfailing sustenance. In like manner the same animal will drink every kind of water, no matter how brackish, stagnant, or putrid.

---

[1] A good Bikaneer riding camel will beat this.—*Trans.*

A camel can go for two, three, or even four days without drinking, and though he is weakened thereby, still he as pluckily carries his load as though he had had water enough. During the summer a camel generally drinks but once in the 24 hours, and in autumn and winter but once every two or three days, especially if water is at all scarce.

The same animal can pass three days without food. But either deprivation of solid food for two days, or of liquid food for four consecutive days, greatly weakens it, and in order to prevent it perishing under such privations its load must be immediately and very materially reduced, the full weight not being reimposed until the lapse of a week from the date of the restoration of the named necessaries.

In the beginning of spring, camels generally cast their hair, which falls until the animal's hide is almost completely bare. The full-grown animals at such a time have only tufts on the head, lower part of the neck, and here and there on the thighs. By the setting-in of winter the hair begins to grow again, still it is not sufficient to give the animal warmth, and therefore the nomads clothe their camels with leathern *jhuls*. The same coverings too are put on, even in the summer season, especially in localities swarming with gadflies that so terribly afflict animals of every kind. The country along the central and lower course of the Sir, and even at the mouth of the Amu, is so infested with these pests that cattle simply cannot there exist in the summer season, and are therefore removed by the nomads from the places just indicated.

Camels do not readily fall from fatigue, but if the weight of the load causes them to do so it is not possible to move them.

Even if the load be removed a jaded camel need not be further dealt with, and can only be left by the roadside.

Camels are not subject to epidemic diseases. Siberian plague or *yázva*, which afflicts both horses and horned cattle, is innocuous to camels. But glazed frost, of which mention has been made in a previous chapter, causes almost as much destruction to camels as to every kind of herd. But since the camel is able to nibble at reeds and bushes it effects its own preservation to a greater extent than can any other animal. With the re-appearing of spring grasses the emaciated camel picks up more slowly than cattle of any kind, and indeed can scarcely be said to be in condition till the autumn season has set in. For this reason, during the spring, loads of greater weight than 12 *puds* (432 fbs) are not at once put upon camels, but by degrees until the weight reaches the normal standard.

A camel, more than any other animal, dreads moisture, which indeed kills it. Accordingly the nomads always strive to get away from those localities wherein a large quantity of stagnant water generates moisture in the atmosphere.

Amongst the number of diseases peculiar to camels the *Sarp* sore should be enumerated. This causes the soles of the animal's feet to fall off. Its cure is effected in the following manner:—

The entire leg of the camel below the knee is washed with camel's milk and round it is then sewn a leather covering filled with hot mutton fat. This covering, by closely adhering to the diseased foot, moulds itself to the shape thereof. Should the camel be rested after this treatment the sore will heal very gradually. Generally speaking, however, freedom from work and perfect rest are the most real cures in practice by the nomads for all possible ailments, internal and external, appearing amongst their camels. Should an excessive weight or an ill-adjusted load be placed on the animal sores will appear on its back and flanks.

In such cases, if the animal does not get time to rest and to recover from the chafing, its load, by rubbing against the excoriated part, will induce deep-seated ulcers, but to neither of these evils do the nomads pay such attention. It is only when worms appear in such wounds that they operate with wooden needles; or else, having lanced the whole of the afflicted part, they apply a poultice of mutton fat or of chewed *chit* grass, or finally, when the removal of the worms becomes a difficult operation they smear the sore or ulcer over with snuff.

Old or diseased camels that are unfit to carry loads the nomads kill and eat. The meat is not tasty and, moreover, is tough. That, however, of the camel suckling is very much prized, and procurable only by the few rich folk who treat themselves to the delicacy on the rarest and most extraordinary occasions.

Camel's milk is rarely enjoyed by the nomads during the winter. In the autumn season with good milking the female camel will yield two or three *shtoffs* (square bottles containing about one-tenth part of a bucket) in the 24 hours, but she will not give more than sixty pails-ful in the whole year.

Camel's hair is used for various purposes (*vide* previous chapters). The camels are shorn in June and about 12 lbs. of hair are taken from each. The most common articles manufactured from it are *Armyáchinas*, bags (*kaps*), *kibitka* fastenings, lassoes, and the like.

Camel's hide is likewise used for the manufacture of domestic utensils, straps, &c. The cost of a hide is about 2 *roubles* (5*s*.), or, perhaps, higher.

At Táshkand a camel sells for from 50 to 80 *roubles* (£6-5 to £10), and about the same price obtains in other parts of Turkistán.

CHAPTER X.

FORESTRY.

(General glance at the forest wealth of Turkistán and state of forest conservancy.)

Distribution of forests over Turkistán—Various kinds of wild trees indigenous to the soil of Turkistán—The fir, poplar, birch, &c.—Investigation of the mountain forests of the province of Semiraitchensk—Measures adopted by the local administration for the conservancy of these forests—Question as to the artificial development of forests throughout Turkistán—Establishment of a nursery garden in the province of Fargána —Timber trade—Detailed account of the floating down of mountain timber on the Zarafshán river as far as Sámarkand and Bukhára—Floating down of timber on the Sir from Namangán to and below Khojand—Floating down of timber on the Ili from Kulja to the Ili (Russian) Settlement—Price of timber at Táshkand, Sámarkand, and in the forts on the Sir-Daria—Fuel available at the various points of the Turkistán military circle—*Saksaul*—Description of this vegetable growth—*Saksaul* fuel and its prices—*Kolutchka*—Prices of firewood at Táshkand—Coal as an article of fuel for the troops—Dried cowdung—Prices of fuel at Vairnoye—Prices of fuel in the Kuljan region.

DISTRIBUTION OF FORESTS.

The Turkistán circle may be said to belong to the category of tracts that are the most meagrely endowed with forest wealth.

In the Sir-Daria and Fargána provinces and in the Zarafshán circle forests do not exist, whilst in the province of Semiraitchensk they are solely confined to the mountain country wherein they clothe the northern slopes and defiles of both the main and minor ranges. In these forests the tree most commonly met with is the sapin or red fir, and this attains a height of about 70 feet.

Within the confines of the Province of the Sir-Daria the fir is first noticed in the Urtak-Tau mountains, which lie approximately within the same meridian as the town of Aulie-Ata[1]. West of this it becomes less frequent, whilst in the Semiraitchensk province it forms thick forests. But the forest growth of the red fir is found on the northern slopes of the Terskei-Tau between limits running east and west and beginning at the gorge of the Ton river[2], *i.e.*, to the west of the river Barskaun. The stretch of this forest zone is of almost equal breadth and density throughout its extent, and it is continued to the east and along the Mustág and Narát ranges. This vast expanse of vegetable wealth which covers the tract indicated and is scattered over the slopes from crest to base is on account of its facility of access deserving of especial attention. In the gorges lying deep within the northern slopes of the Terskei-Tau range, the forest growth begins 3 *versts* (2 miles) distance from their mouths and covers the sides of the mountains upwards for an extent exceeding 25 *versts* (16⅔ miles).

In the basin of the Nárin and in the bed of the same river fir growth begins in the neighbourhood of the mouth of the Kurmenta river. At first it is confined to the northern slopes[3] whereon it stretches in an almost unbroken belt right up to Fort Nárin and west of it again. It then gradually narrows until it reaches the mouth of the river Kolának, which lies 40 *versts* (26⅔ miles) below the fort just mentioned.

Over this expanse, and on the right bank of the Nárin, forest is thus met with, occasional breaks excepted, for a distance of 22 *versts* (14⅔ miles), *viz.*, from the mouth of the Shabota river—17 *versts* (11⅓ miles) below the mouth of the Kurmenta river, up to the mouth of the Chayan.

The same kind of forest is found along the river On-Archa and the gorge of the united streams of Sultán-Sára and Káragátch. The lateral gorges of the On-Archa have likewise a forest growth. Along the Ottak trees make their appearance somewhat above the mouth of the ravine wherein lies the road leading to the Dolon pass. Below this point forests appear at intervals on both the northern and southern slopes of the pass and crest, 5 *versts* (3⅓ miles) short of the junction of the Ottak and On-Archa. Hence, to the mouth of the Nárin, vegetation is confined to the scrub which grows on either side of the river bed.

Along the Jeregetásh conifers are found almost up to the point where the river gorge debouches on to the wide valley of the Nárin. On the Koidjerta conifers begin about 18 *versts* (12 miles) from Nárin and end at a point 20 *versts* (13⅓ miles) from Lake Son-Kul, over which expanse they cover, with breaks here and there, the sharp slopes of the gorge.

On the At-Básh-Tau range forest growth is confined to the northern slopes, and here only from the mouth of the Tuz-Ashu river up to the Bojushta stream.

---

[1] About 43° north latitude and 73° east longitude.—*Trans.*

[2] Not marked on Walker's Map of Turkistán, 5th edition.—*Trans.*

[3] These slopes are less exposed to the action of the sun's rays and therefore retain moisture for a longer time. Hence is the explanation of the forest growth of the Tián-Shán being almost exclusively confined to them.—*Author.*

The gorges of the Kinda, Tuz-Ashu, Bojushta, and other rivers are likewise covered with a thick growth of red firs.

The gorges, lateral but principally longitudinal of the Nárin-Tau in the neighbourhood of Fort Nárin, are clothed here and there with forest; for instance, near the Char-Karitma pass. But this pass is difficult of access.

On the river Kurtka there is a small stretch of forest not exceeding 5 *versts* (3⅓ miles) long, which lies near the source of that river and in the neighbourhood of the Mulda-Ashu pass. Beyond this forest growth occurs on the southern slopes of the Dongus and Kabak-Tau and on the highlands of the streams which fall into the Nárin.

On the river Baibitche there is a small fir grove at the foot of the first Baibitche pass and on the northern slopes.

In the Jumgal mountain system conifers are only found in the upper valley of the Káragai-Kulda river (where the road to Susamir crosses the Oya-Kain pass). On the banks of the united rivers Káragai-Kulda and Susamir there are birch groves.

Between the natural boundaries of Togus-Tarau and Ketmen-Tube there may be seen, from the road, (leading over the Kazik-Bel pass to Ketmen-Tube) in the gorges on the southern bank of the Nárin fir groves of great density.

Along the upper course of the Kainda and of its affluents thick forests are also met with.

Along the Uzun-Ahmad the fir and the juniper are found from 10 to 12 *versts* (6⅔ to 8 miles) above the mouth of the Ayak-Tik just about where the Kára-Kunges enters that river. Thick growths too of the former tree begin 5 *versts*, (3⅓ miles) above the mouth of the Terek-Su and along its valley and cease only 4 *versts'* (2⅔ miles) distance from the pass of the same name.

Fir forests are also found on the northern slopes of the Talas mountain system, specially along the Bish-Tásh branches.

In the Chu river system fir forest occurs in the Buám defile and especially in the gorges of the greater and lesser Kebins, also on the northern slopes of the Alexander range[1].

The gorges and northern slopes of the Dungar Ala-Tau and of the Borokhoro range abound in fir forests.

Besides the fir there are found in the mountain districts of Semiraitchensk the following: birch, wild apple, apricot, *artcha* (juniperus pseudo sabinus), elm (kára-gátch), *jida* (Eleagnus), sorb and others.

To define the extent of country that is covered with forest growth would in no way be possible because surveys of the forest lands have not yet been undertaken.

It may, however, be confidently maintained that the amount of forest growth in the Semiraitchensk tract, as compared with the whole area of that province, is very limited, and that the forest lands in question would not be worth the labour expended on their care and maintenance. The climate of the province of Semiraitchensk is very dry, and in consequence of the forests that were there having been destroyed by the first Russian settlers, it has become still more arid, and continues to become more so year by year. Indeed it may be said that the streams of small volume which take their rise in the mountains of this province rapidly dry up from the same cause.

---

[1] Kaulbars: "Materials for the geography of the Tián-Shán." St. Petersburgh, 1875, pp. 116 to 119.—*Author.*

Vairnoye, the provincial town of Semiraitchensk, which is situated on the river Almatinka, stands the chance, in consequence of the destruction of the forests in the mountains, of being deprived of all its water-supply.

In view of such a state of affairs the Local Administration, in order to conserve the mountain forests, has adopted certain measures, *viz.*, a prohibition against the erection of wooden structures in the towns and settlements along the mountain ranges which still have some forest growth left. The felling of forests has been encompassed by many formalities. Thus every individual who wishes to cut down trees is obliged to submit to the chief of the district a statement showing how many trees he requires, what the dimensions are of each, for what purpose he wants them, &c. In addition to all this he has to pay a tax amounting to from 15 to 60 *kopaikas* (4½ to 7*s.* 6*d.*) for every tree felled according to the dimensions of each. Still the object in view has not been completely attained, for young trees are cut down whilst the older ones are allowed to stand. It would seem more likley to be useful were the payments and formalities dispensed with, and a simple prohibition issued against the felling of young trees, the dimensions being given within which no trees could be touched, all others, *i.e.*, full-grown trees, being available by those who require them. In this way forest economy would have its stages whilst new generations of forest growth would gradually take the place of the older specimens.

The officials of the province of Semiraitchensk are being constantly urged to greater assiduity in the forest conservancy of their respective districts. Provincial circulars to the following effect are frequently fulminated, directing (1), the prevention of forest felling of any kind; (2) the preservation of the forest lands from fires; (3), the suppression of any act likely to injure the growth of the trees, such as the storing of resin, the stripping off of birch bark, twigs or bast, &c.; (4), the prohibition against any clearing of forest land or of grass-cutting in the same.

In order to induce the natives to take an interest in forest conservancy, the Semiraitchensk provincial authorities proposed that *kizyák* (dried cowdung) should be brought into use instead of firewood. To this end the best way of preparing the new fuel was shown to the natives, and those of them who followed the idea received prizes of from 10 to 15 *roubles* (£1-5 to £1-17-6), as well as the thanks of the provincial authorities.

Within the Sir-Daria province wild growths of trees are only found in the mountains forming the most westerly spurs of the Tián-Shán range, and more especially along the upper course of the Chirchik and of its affluents.

Here the chief kinds are the poplar, birch, willow, juniper, hazel-nut, plane, maple, apple, mulberry, and others.

The two first-named trees sometimes attain great proportions. Thus poplars are seen with a girth of 1½ to 2 arms' lengths and birch trees with a girth of 1½ of the same measurement. But trees of such proportions are rare specimens; indeed, as a rule they are stunted, crooked, and with ragged foliage. This is probably due to the fact that the Kirghiz are in the habit of curtailing the roots of the tree to get material for their saddles, and so the natural growth of the robbed stem is impeded.

Birch trees sometimes grow in clumps or groves, which cover a surface of a square *verst* (⅔ square mile). Such groves are often seen along the left affluents of the Chirchik river, and at a distance of from 150 to 170 *versts* (100 to 113⅓ miles) from Táshkand. The better kinds of the same tree are found along the rivers Tebek and Biskán[1].

The poplar along the upper Chirchik attains a great size which exceeds that of the birch. This tree, however, as a rule grows separately, and is not found in groves as is the case with the birch.

The *Archa* (Juniperus) with a dendroidal resinous berry is very rarely mixed with other trees, and as a rule but single specimens are seen and these in the inaccessible gorges of the central and upper Chirchik and of its tributary streams. The stems of this tree reach a height of 56 feet. They are fairly straight, but knotted. It is noticeable that north of the basin of the Chirchik in the Kára-Táu mountains, which form the north-western extremity of the Tián-Shán ramifications, the *archa* does not grow. It is, however, very plentiful in the gorges of the Alai, Turkistán, Zarafshán, and Hissár ranges, where, indeed, its frequency almost amounts to a forest.

The *Káragátch* (Elm-Ilim-Ulmus) in a wild state occurs but seldom, but its cultivation is much pursued in gardens. This tree is distinguished for its high price, but its durability causes it to altogether supplant the oak. The trunk of the elm sometimes attains a girth of over 4½ feet, and its height exceeds 70 feet. This tree grows straight and uniformly, but it almost always has numerous and deep-seated excrescences in its lower extremities.

Along the upper course of the Chirchik the hazel-nut attracts attention, being especially abundant in the Pskem valley near the village Bogustán. At this point the whole of the north-western slopes of the mountain base are covered with this tree, the specimens of which number several thousands. The wood of the hazel-nut is very suitable for joinery of all kinds.

Notwithstanding that the virgin forests along the upper Chirchik are not much interfered with for building purposes, the area of such rapidly decreases year by year. The cause of this is that the nomads, who are ignorant of forest economy, act in respect of these forests very ruthlessly. For instance, they drive their cattle to pasture in them, thus the young seedlings and shoots are destroyed, because the nibbled ends will not grow forth again. They, moreover, hack at the roots of the trees, light fires, burn charcoal in the trunks, and as they never put out such fires vegetation is burnt down over a large area.

---

[1] According to the investigations of Mons. A. V. Bunyakovski, on the western branches of the Tián-Shán, the birch is distributed only over the Bitchán pass (the river of this name is a tributary of the Alabuga and the Bitchán pass leads into the Province of Fargána). See articles and notes extracted from the *Izvestiya* (Intelligence) of the I. R. G. Society for 1870. My researches show me that east again of the Tián-Shán, the birch once more appears, but only along the course of the Nárin-Kol (an affluent of the Tekes) and in the Urten-Muzárt gorge, and there but occasionally.—*Author.*

The Russians have just endeavoured to examine the forests along the Upper Chirchik, and have endeavoured to float timber down this river to Táshkand. But both in the shape of timber rafts and single logs all attempts have signally failed. As far as the village of Khodjakand timber can be taken down on pack animals and thence to Táshkand, a distance of 76 *versts* (50⅓ miles), *arbas* or carts can be employed. But such operations cannot but be very limited, because (1) the cutting down of mountain forests has a bad influence on the climate; and (2) the transport of timber is not cheap, nay, it is dearer than that derived from the artificially-raised trees in the gardens of Táshkand.

In the mountains on the far side of the Sir-Daria, *i.e*, in the Turkistán range to the south of Khojand and Ura-Tube and in the mountains flanking the upper course of the Zarafshán river, the scanty wood growth in the gorges consists of *archa*. But thicker clumps and larger specimens of the same tree are found in the neighbourhood of the Pasrut and Artutch gorges, along the upper course of the Zarafshán, near the Shagriston pass and round about Lake Iskandar-kul. On the Alai range, as stated above, the *archa* is confined to gorges, and it there lies within a belt situated between 6,000 and 11,000 feet above the sea. This tree is used by the natives in the construction of the roofs of their houses and also as fuel. The birch and deciduous trees generally are met with much less frequently on these mountains and about Lake Iskandar-kul, the Pasrut pass, the highlands of the Zarafshán river, and anywhere in the gorges of the Alai range.

Artificial raising of trees.—The dearth of natural forest growth in the land has induced the natives to turn their attention to the artificial raising of trees likely to furnish them with building material. Therefore in such parts of Turkistán as the population is at all considerable, side by side with fruit trees we find under cultivation timber-growing trees, or such as are useful for joinery and fuel purposes, and so in almost every native's garden will be seen several specimens of the poplar, willow, and elm. The first and last kinds are reserved for carpentry and building purposes, the second, supplemented by the apricot and sometimes the *jidda* (*Elæagnus hortensis*), serves as fuel. As fuel the trees mentioned rank in the following order, apricot, *jidda*, poplar, willow.

With respect to the artificial propagation of trees in the steppe country the natives had of course no sort of idea. This matter was taken in hand by the Russian administration. As a commencement, General Aide-de-Camp Von-Kaufmann, Governor-General of Turkistán, established in 1878 a forest nursery in the town of Margilán, situated in the province of Fargána. The object of this was to experiment on, and diffuse over the steppe, not only forest, but also fruit-bearing trees. The superintendence of this business was entrusted to Mons. Kopmann, a scientific and practical forester, who had completed a course in the highest horticultural institute of Germany. Attached to this nursery it was proposed to form a small class (at first consisting of six men), who would educate others, and by that means would be started forest and garden plantations throughout the land. The undertaking is now in thorough working, and the experiments made justify the hope that in the course of four years it will be possible to yearly distribute over the steppe and mountain bases 7,000,000 specimens of wood growths, which will spring up without the aid of irrigation.

According to the experiments in progress, and the dryness of the soil of the several localities, the best timber-growing trees for southern latitudes appear to be the following: *Gleditichia Triacanta, Aylanthus glandulosa, &c.* Of conifers the most suitable kinds are *Pinus Halepensis* and *Pinus Taurica.* To the more moist localities and possessed of a warm climate the following seem most adapted: *Sequoia Sempervirens, Wellingtonia gigantea, Taxodium distichum,* all of which are reared in the Margilán nursery in large quantities.

The *Eucalyptus Globulus*, which has proved such a valuable tree in the low-lying parts of Algeria, does not seem to be of much use in Turkistán, because it cannot stand many winters.

With regard to acclimatizing other and more hardy species of the Australian gum tree, no judgment can be formed in consequence of the insufficiency of the trials made to do so.

In the town of Vairnoye a school of gardening has been established for some years, at which there are 25 pupils in training under an experienced gardener. This school is attached to the beautiful city garden, and at it the pupils put the theory, taught to them during the winter, into practice during the summer. These pupils are collected from all the stations of the Semiraitchensk province, and on the completion of their course take back to their villages scientific notions of forestry, horticulture, and kitchen gardening.

Forest industry.—This, in the sense of its practice in European Russia, does not exist in Turkistán. Every one must, therefore, buy his timber direct on the spot, even if he has not to fell it himself.

The floating down of forest produce is carried on on three rivers; (1) on the Zarafshán from the mountains of Kohistán to Sámarkand and even to Bukhára; (2) on the Sir Daria from the neighbourhood of Námagán in the Fargána province to Khojand, Chináz, and even to Kázalinsk (Fort No. 1); and (3) on the Ili from Kulja to the Ili settlement.

Timber floating on the Zarafshán begins at the point where the Sujina mountain stream enters it through its left back. From Dásht-i-Kázi to the mouth of the Sujina the course of the Zarafshán is through high overhanging banks. Herein it has one channel that divides only in certain localities into two and sometimes three branches. Its bed contains no large boulders and its current though swift is not headlong as there are no falls. In the month of January, at which time its level is lowest, the Zarafshán has a depth of from 3 to 4 feet.

The natives affirm that above Sujina timber-floating is not possible because of the great velocity of the current and that attempts have been made by them to send timber down from the Kshtut-Daria but that its course cannot be directed by reason of the sinuosities of this river. They say also that rafts when used are violently dashed against the hard conglomerate of the banks, and after two or three whirlings of the current break to pieces.

Thus until we have other data we must consider the Zarafshán to be a timber-floating river only from the point at which the natives cast in their logs. The Sujina takes it rise in the snowy range of Sultán Hazrat, and flows along the base of mountains which are covered with trees suitable for building purposes. A low chain of mountains approaches the left bank of this river, whilst on its right bank tower the high spurs of the Kshtut range. Twenty *versts*, (13½ miles) distance from its mouth the Shing stream enters it through its right bank. The Sujina may be also classed as a timber-floating river, because wood very suitable for building purposes is borne by it to the Zarafshán.

There are three principal timber stores or stations on the Zarafshán within the limits of the province of the same name, *viz*, at the village Sujina in the town of Panjkand and at Chupán-Ata. In the two first is stored forest timber only: in the latter all kinds of wood, great and small logs, as well as artificial and garden-grown logs.

The transport of wood from the mountains to these stores goes on the whole year round. In the trade poor Gálchas are principally employed, men, that is, who own one or perhaps two mules. The obtaining the wood supply from the mountains is a business of extraordinary difficulty and even danger. The hewn timber is usually cut up on the spot into beams of the length of ordinary square cabin rafters. Two of such beams are packed on a mule, one on each side. And since the hewing down of the forest for building purposes, for the manufacture of charcoal and for fuel purposes, goes on without any system and without the least supervision, it is evident that even now the forests have disappeared in all the more accessible places. Now-a-days for good building material one must mount to the summits of high crags or descend to the bottom of precipices or ravines. Since a mule carries two beams from the mountains it not unfrequently happens that the animal stumbles from the weight, is then hurled from steep places, and dashed to pieces. In the more dangerous points the mule has to be unloaded and the beams carried across by men, or else rolled down the sides of the crag. The presence of such difficulties causes the men engaged in the timber trade to form small parties for reciprocal aid. One gang engages itself in hewing the timber, another in cutting the logs, a third in transporting it to the stores. At these stores, either Sámarkand or Bukháran contractors buy the logs as they are brought in and arrange them in regular stacks. The price of one such log varies from 30 to 40 *kopaikas* (9*d.* to 1*s.*). From about the $\frac{10\text{th}}{22\text{nd}}$ March the rafts are once more put together, and by the beginning of April (old style) they are let loose on the river. The same people take part in both the carriage and the floating of the timber. Three workmen will put a raft together in three or four days. For conveying a raft to Bukhára each workman expects to receive from 6 to 10 *roubles* (15*s.* to £1-5). Those receive more who have before engaged in the trade, because they are well acquainted with all the dangerous parts of the Zarafshán and of its branches. Two hundred beams are packed on one raft and are arranged in three throws, one beam on the top of the other. The ends of the logs forming the bottom of the raft are let into each other: the rest are simply kept in their places by wooden pegs, cords or twists of osiers. The rafts are guided with long poles. As far as Chupán-Ata the same poles serve to check the speed of the raft, because as far as the place mentioned the current is so swift as to be dangerous for a badly constructed float. Beyond Chupán-Ata, however, rafts used on either the Ak or Kára Daria are taken along by such a sluggish current that they are usually guided by one man. Indeed certain raft-owners maintain three men for the working of the rafts as far as Chupán-Ata only, beyond which the sole charge rests with one man.

As stated above Gálchas convey the timber to Sujina and Panjkand, where they sell it to Sámarkand or Bukháran merchants, or even to the local inhabitants. Prior to 1860 and 1861 nearly all these middlemen hailed from Bukhára, but since then native merchants from Panjkand compose the majority and the Bukháran traders have been reduced to three.

To Sujina and Panjkand from 100 to 150 rafts are floated down yearly. To one owner will belong from three to five, and rarely as many as ten, for in this trade men are not engaged possessed of several free thousands.

The rafts descend the Zarafshán in batches at a given distance from each other. On nearing Chupán-Ata they draw near the Sámarkand timber stores, where if there are buyers they discharge. From the mooring station a portion of the rafts descend the Ak-Daria and a portion the Kára-Daria, for by these two branches is the Zarafshán river known at Chupán-Ata.

Up to the month of May the rafts descend indiscriminately either arm, but when May sets in they principally descend the Ak-Daria, into which at Chupán-Ata is let a portion of the water of its sister branch and so becomes a deeper and more rapid stream. Forty *versts* (26⅔ miles) from Bukhára, rafts whether they have descended by the Ak-Daria or the Kára-Daria, enter the deep and wide canal of Shahábád along which they pass to Bukhára or rather seven *versts* (4⅔ miles) from it, the mooring station being at the village Gurbun. From this point the timber is conveyed either on mules or camels to Bukhára.

From the Sámarkand stores are yearly floated towards Bukhára and the other towns of that Khánate by the water communication which we have described, 200 raft-loads of poplar, willow, and fruit trees.

Besides to the three abovementioned principal timber stores, rafts are despatched to Dajbit, Chimbai, Askán, Alvai and Katta-Kurgán, as many as from 40 to 50 raft-loads being floated to these places.

From Panjkand rafts descend to Bukhára in from 10 to 20 days according to the volume of water in the particular channel which they take.

Timber-floating goes on up to the month of September, and every crew endeavours to get three rafts from Panjkand to Bukhára whilst the season lasts. From what the natives say, however, rafts could be conveyed over the Zarafshán and both its branches the whole year round, for neither one or the other completely dries up. Indeed, shallows only occur at certain well-known fords. Timber-floating is now only carried on during six months of the year, because this period amply suffices for the conveyance of the required amount of building material to Bukhára and other places, and because in the month of September the water of the Zarafshán becomes cold. The raftsmen do not therefore care to engage themselves in the work for a longer period.

The net profit per beam amounts to 5 *kopaikas* (1½*d.*), consequently a merchant possessing ten rafts clears 100 *roubles* (£12-10-9).

Up to the present time the natives have not attempted to float down the Zarafshán either firewood or the various bulky articles, or even grain. Occasionally, indeed, will be seen on the rafts the various wood manufactured articles which form the crafts of the Gálchas, such as the several component parts of spinning wheels, of looms, spindles, axes, &c.

Let us endeavour to arrive at the approximate number of beams cast upon the water of the Zarafshán and the amount of capital which they represent.

From the Sujina and Panjkand stores are yearly despatched from 100 to 150 rafts, from the Sámarkand stores 200, from the remaining stores 50. Consequently from 350 to 400 rafts are yearly floated down the Zarafshán, or, in other words, from 70,000 to 80,000 logs of building material.

The capital which these represent exceeds 32,000 *roubles* (£4,000). The cost of hewing probably amounts to from 3,500 to 4,000 *roubles* (£437-10-6 to £50) *per annum*.

The Zarafshán is not regarded by the natives as a convenient and cheap water communication and they do not know how to make use of it as such. The fact that they float timber on it is not an indication to the opposite effect, inasmuch as they take up this occupation out of sheer necessity. The Khánate of Bukhára is forestless: the groves and gardens surrounding the city are strictly preserved against all hewing. And since within the last 15 or 20 years all the houses of Central Asia have been thrown down, the re-constructions and alterations entail, with each year, the consumption of a larger amount of wood. The rulers of Bukhára have always ordered that their capital shall be furnished with building material from the valley of Miánkala and from the mountains. At first this supply was furnished overland, but subsequent occurrences have shown the inconvenience and dearness of this method of transport. The natives have therefore turned for aid to the Zarafshán, and have begun to build rafts, but to these is the benefit and use of the river confined. Throughout the whole stretch of the Zarafshán neither ferry-boat nor barge will be seen.

From the Námangán district of the Fargána province timber-floating has been and is now carried on by means of rafts. Wood which is merely garden grown, such as poplar or willow, is merely thrown into the water, the dearer kinds, such as elm, plane, &c., being placed on rafts. The principal wood store, whence most of the rafts are launched, is the settlement of Aksa, not far from Námangán. As far as Khojand the timber is taken with tolerable ease. But below Khojand bars hinder the easy passage of the rafts and often break them up or toss them about. Herein lies the reason why below Khojand rafts are taken in lesser number with each year, and why at the towns of Perovski and Kázalinsk (Fort No. 1) timber is only 15 per cent. cheaper than that imported to these places from Orenburgh.

From Kulja along the Ili river timber-floating is still more inconsiderable both on account of the difficulty of the operation and because the Ili settlement, from its small size, does not require a large amount of wood. The town of Vairnoye and all the settlements along the Ala-Tau are better supplied with wood which grows in the mountains around them.

There is only one saw-mill in Turkistán, and that is at Vairnoye.

It is a private enterprise and was established in 1871. It is worked by water power acting on a turbine wheel. The price of sawing at this mill is as follows: for a beam 14 inches thick, 1 *kopaika* (about 1⅕ farthing) per sawn length of 2⅓ feet; for a beam 19¼ inches 1½ *kopaikas* (about 2*d.*) for the same length; for a beam 2 feet and ½ inch thick 2 *kopaikas* (about 3 farthings) for the same length. The average cost of beams sawn in the mill is 70 *kopaikas* (1*s.* 9*d.*). Attached to the mill are a foreman, a blacksmith, and six workmen.

Prices of Timber at Táshkand.

NAME OF MATERIAL.	DIMENSIONS.		PRICES.	
	Length in *arshins*[1].	Thickness in *vershoks*[1].	*Roubles*[1].	*Kopaikas*[1].
Poplar beams	3	4	1	20
	3	5	1	80
	3	6	2	50
	4	3	1	90
	4	4	2	
	4	5	2	65
	4	6	3	40
	4	7	4	30
	5	3	2	50
	5	4	3	
	5	5	3	60
	5	6	4	30
	5	7	5	50
	6	4	4	
	6	5	4	80
	6	6	5	80
	6	7	7	
	6	8	7	50
	7	4	4	75
	7	5	5	80
	7	6	6	50
	7	7	8	
	7	8	8	50
	8	5	6	50
	8	6	7	50
	8	7	9	
	8	8	9	50
	9	5	7	30
	9	6	8	50
	9	7	10	
	9	8	11	
Poplar planks, per running *sajen* (7 feet)	5	1		55
	5	1½		70
	5	2		90
	5	2½	1	10
	5	3	1	35
Willow planks	5	1		65
Poplar scantlings per running *sajen* and square inch		2		25
		2½		30
		3		40

Poles of willow or poplar wood per length of 14 feet and 3½ inches thick cost 60 *kopaikas* (1*s.* 6*d.*). A pole of the same length but only 2⅜ inches thick is priced at 45 *kopaikas* (1*s.* 1½*d.*).

---

[1] An *arshin* = 28 inches; a *vershok* = 1¾ inches; a *rouble* about 2*s.* 6*d.*; a *kopaika* about 1⅕ farthings.—*Trans.*

Wattles, 21 inches long and 2⅜ inches thick, cost 1 *kopaika* (1⅕th farthings).

Seedling willow stems, 14 feet long and 2⅜ inches thick, cost 10 *kopaikas* (3*d.*) a piece.

In Sámarkand the prices of timber are as follows :—

NAME OF MATERIAL.	DIMENSIONS.		PRICES.	
	Length in *arshins.*	Thickness in *vershoks.*	*Roubles.*	*Kopaikas.*
Willow or elm beam	7	5	6	
	7	4½	4	
	7	4	3	60
	7	3½	3	
	7	3	2	40
	6	6	5	
	6	5	4	40
	6	4½	4	
	6	4	3	
	6	3	2	40
	5	6	5	
	5	5	4	40
	5	4	3	
	5	3	2	40
	3	6	4	
	3	5	3	
	3	4	2	40
	3	3	2	20
	2	6	3	
	2	5	2	20
	2	4	1	80
	2	3	1	20
	1	7	2	
	1	6	1	60
	1	5	4	40
	1	4	1	20
	1	3	1	
Poplar pole	7	3	1	20
	8	2	1	40
	6	2		80
	6	2⅓	1	
	12	2	1	60
Willow Stake	2⅓	2		35

We should here observe that planks are not sold in Sámarkand; willow stakes of less than the above indicated measurements cost from 15 to 25 *kopaikas* (4½ to 7½ *d.*). Beams of greater length than 7 *arshins* (16 feet 4 inches) are scarcely ever sold. The above prices only show the cost of material on the spot exclusive of carriage.

With regard to timber supply, the forts on the Sir-Daria (Kázalinsk or Fort No. 1), Fort No. 3 or Perovski and Julek, lie under the most unfavourable conditions. Building material is furnished to them from Orenburgh and is sold by weight, the prices *per pud* (36 fbs) being regulated by existing transport rates. At Kázalinsk the price of a beam fluctuates between 70 *kopaikas* and 1¼ *roubles* (1*s.* 9*d.* and 3*s.* 9*d.*) *per pud* (36 lbs). Wood brought from the upper course of the Sir-Daria, from the Fargána province, is of much worse quality than that imported from Orenburgh, but nevertheless it is very dear. According to the number of rafts floated down from the province of Fargána, the timber therefrom is only from 10 to 20 per cent. cheaper than that brought from Orenburgh.

The settled points of the province of Semiraitchensk in respect of timber supply are much better off. There the wood can be had for nothing except the fell-tax above mentioned.

Fuel.—In the Turkistán circle the most varied materials are used as fuel; in the province of Semiraitchensk elm supplies the chief material for firewood. Within the Zarafshán circle, as also in the southern parts of the Sir-Daria, and Fargána provinces, garden-grown trees, such as willow, poplar, and peach and those akin to these species serve as fuel. Other fuel is furnished in the shape of reeds, thorns, and cowdung. In certain points, too, as for instance at Táshkand, Chimkand, and Khojand coal is procurable. Lastly in the forts on the Sir-Dária, (Julek, Perovski, No. 2 and Kázalinsk or No. 1,) *saksaul,* thorny reeds and in small quantities cowdung furnish material for heating and cooking purposes. Coal is in use, too, in the town of Kulja.

But of all the kinds of fuel that we have named *saksaul* is deserving of special notice because of its cheapness, abundance, and good heating properties.

Saksaul reaches a height of 2 *sajens* (14 feet) and thickly covers the sand hills of the vast Kára-Kum, Kizil-Kum, Moyun-Kum, and other wastes. Extensive growths of the same vegetable production in the form of forests flank the Sir Daria and mark the course of that river over 300 *versts* (200 miles) from the natural boundary of Tumen Arik as far as Fort No. 2. *Saksaul* is almost everywhere accompanied by, or to speak more correctly, gives place at intervals to, clumps of tamarisk, thorn bushes (*Halimodendron argenteum*), *jida* (*Elæagnus,*) and willows or osiers: the last two growths frequently attaining the height of trees.

Saksaul in appearance is striking on account of the extraordinary irregularity and crookedness of its stem and for the crumbly and scaly property of its leaves. The stem of this tree is not composed of even and yearly growing layers, but is made up of several joints, the growth of which is far from being uniform. The examination of Mons. N. I. Jelaiznoff has shown that of these several joints on the same stem some have 55 yearly rings, other as many as 220. Such irregularity in the growth of the several parts of the same stem is caused by the fact that the more vigorous joints have a greater development and so push out and crowd the others, hence the unevenness and knots which characterise the growth of *saksaul,* a process which goes on with extraordinary slowness.

Its wood is so compact that after being soaked in water no saw or axe will cut it, but being brittle it is easily broken and divided into small pieces. Because of its exceeding hardness, brittleness, and irregularity of growth *saksaul* is quite unfit for carpentry material; but on the other hand, it furnishes, as we have said, splendid fuel. On being heated up it gives out a fierce flame which exceeds that of burning coals.

The Russian Aral fleet uses great quantities of *saksaul* for heating purposes. For these steamers stores of *saksaul* amounting to 300,000 *puds* (10,800,000 ℔s), are collected yearly along the Sir-Dária and in consequence of this enormous consumption the *saksaul* growth is rapidly lessening along the whole course of the Sir-Daria. Indeed even now about Kázalinsk (Fort No. 1), it has disappeared, and only re-appears within a distance of 80 *versts* (53⅓ miles) of that point.

Experiments, having for their object the determination of the heating power of *saksaul*, have been carried out and have led to these results. For a Dutch stove in use in a room of average size, 1½ *puds*. (54 ℔s) are sufficient *per diem*, or about 45 *puds* (1,620 ℔s.) *per mensem*. This quantity is equal to a *sajen's* (7 feet) measurement of the birch fuel of European Russia, or of the peach firewood of Táshkand.

With regard to the quantity of *saksaul*, which, in respect of heating power, equals coal, no experiments unfortunately have been made, but in the case of the Aral flotilla it is supposed that the proportion of the former is as two *puds* (72 ℔s) to one of the latter.

At Kázalinsk if *saksaul* fuel be laid in September or October, it can be bought for 10 *kopaikas* (3*d*.) per *pud* (36 lbs) or even cheaper, but if it be not got in before the spring, when the Kirghiz go upon their summer wanderings, the price of it rises to 17 and even 20 *kopaikas* (about 5*d*. or 6*d*.) per *pud* (30 ℔s).

At Kázalinsk thorn scrub is somewhat cheaper than *saksaul* because it grows nearer at hand. But, on the other hand, this kind of fuel being more bulky it requires peculiarly constructed stoves with a wide mouth and high smoke shaft. Thorn fuel is procurable at Kázalinsk for from 6 to 8 *kopaikas* (2*d*. to 2½*d*.) per *pud* (36 ℔s).

At Fort Perovski *saksaul* sells in the bazaar for from 3 to 4 *kopaikas* (about 1*d*. to 1¼*d*.) per *pud* (36 ℔s).

At Táshkand the following are the prices for a *sajen's* (7 feet) measurement of the several sorts of fuel :—

	Roubles.
Thorn	8 (£1-0-0)
Willow	6 (15*s*.)
Mixed	[1]7 (17*s*. 6*d*.

Sámarkand and Khodjand, as regards fuel supply, are in the same condition as Táshkand. Hence the price for firewood at the various points does not vary very much.

The scarcity of timber as well as of fuel in the Sir-Daria province has induced the local administration ever since the advent of the Russians to adopt measures for the distribution of coal. At first coal mines were opened by the State, then by private individuals (in the neighbourhood of Chimkand, Táshkand, and Khojand). Coal came into use on the steamers of the Aral flotilla, by the troops and by private individuals. But, unfortunately, the distance of the coal mines from the various trade centres and the want of roads to them so impeded the venture that the sale and use of this heating material at the places named above is still limited. There is not a doubt, however, that with the development of trade in the country and the improvement of the roads, the coal industry will be placed on a more solid basis.

---

[1] Three years ago the prices were much higher, *viz.*, from 12 to 15 *roubles* (£1-5 to £1-17-6) for one *sajen's* measurement of thorn, and from 8 to 11 *roubles* (£1 to £1-7-6) for the same quantity of willow. The fall in prices is due to the development of this kind of trade. The Russian settlers, with the prospect of increase in the price of firewood and of building material, began to buy land and to plant it with a view of growing trees for both fuel and building purposes.—*Author.*

In those parts of the province of Semiraitchensk situated at the foot of mountain ranges, whose gorges are filled with forest growth, the settlers make use of fallen and decayed trunks, and, when encouraged by the administration, of cow-dung. The nomads use thorn, cow-dung and reeds for their several purposes.

In the town of Vairnoye the prices of firewood varies from 4½ to 15 *roubles* (11*s*. 3*d*. to £1-17-6) according to measurement.

Thorns at the same place cost from 30 to 40 *kopaikas* (9*d*. to 1*s*. 8*d*.) per load, but the Russian settlers of Semiraitchensk generally refrain from the use of this kind of fuel because of the difficulty of cutting and transporting it. The thorns on the twigs are so tough too that they will readily pierce a man's foot.

In the Kuljan region, besides various garden-grown trees, cow-dung and reeds and the now long used coal comprise the various heating materials. The coal is worked from 10 to 20 *versts* (6⅔ to 10⅓ miles) north-west of the town of Kulja. Five years ago its price at the mine was one *kopaika* (1⅕ farthings) per load; but the cost of conveying it to the town from the mine just doubled its price. Now a *pud's* weight (36 lbs) of coal sells at Kulja for from 7 to 8 *kopaikas* (2¼ to 2½*d*.). The quantity of coal yearly consumed within the Kuljan region varies from 300 to 400 *puds* (10,800 to 14,400 lbs).

CHAPTER XI.

ROCK-SALT AND THAT OBTAINED BY EVAPORATION.

Salt-mines in the valleys of the rivers Kotch-Kur and Nauroz—Salt-mines near the village of Samgár—Salt-mines in the mountains of Hissár (this salt is known by the name of *Básh-Khurd* salt)—Salt deposits (*a*) on the shores of Lake Borogo-Basun; (*b*) at the hamlet of Kámish-Kurgán; (*c*) in the neighbourhood of Lake Ebi-Nor—Unfavourable conditions under which the salt-trade of the Turkistán Circle lies.

All the known salt-mines of Turkistán may be brought under two categories: (1), deposits of true rock-salt; (2), deposits of salt lake evaporations. Of the former, the best known are situated in the valleys of the Kotch-Kur and Nauroz rivers.

Salt-mines in the valley of the Kotch-Kur river.—The valley of the Kotch-kur river in its widest part, *i.e.*, from the point of the entry into it of the Suyiok river up to the mouth of the Juván-Arik, especially on the south side, is almost throughout filled with salt-charged loams of various colours. These deposits take the form of hillocks which run down from the forelands on the southern limits of the valley, and which in the region of the Suyiok river form a separate chain called the Akutchur that terminates on the north side of the valley close to where the river Shamsi enters the Suyiok valley. Below this point the clay is washed, but the yield of salt is limited to small nodules. Salt is opened out and worked only in the southern portion of the Kotch-Kur valley, *i.e.*, near the Tuz-Sai spring. Traces of it are here seen in many places; but it is not met with in a hardened or rock-like form.

Salt-charged soils fall into the Suyiok, whilst the surface of the ground about this river is covered with a snowy-white crust of salt deposit. In the lower lying *strata* the proportion of salt in the clay is increased. Grains of it are here even met with, as also alternate pure salt and gypsum. These, gradually increasing in size, at last form deposits and blocks of rock-salt varying in size and form. Such blocks are sometimes, however, of considerable proportions, measuring, for example, over 100 feet in width, 70 feet in length, and about 30 feet in thickness. It may be supposed, then, that here the accumulations of salt are very great. Indeed the surface of such salt formations covers about 100 *versts* (66 ⅔rds miles). As we have just remarked, salt is worked, too, in many places along the Kotch-Kur valley in the neighbourhood of the Tuz-Sai spring. Regular and constant yield there is not, and the deposits belong to no one in particular. The Kirghiz work such salt for their own use, according to the measure of their requirements. The irregularity of their working exceeds all belief. They use no proper apparatus, and consequently in their digging they are exposed to danger from landslips at every step they take.

Salt-mines in the valley of the Nauroz river.—These mines lie not far from the Issik-Ata post on the northern slopes of Alexander's range, and they scarcely differ at all from those above described; except that here the lower lying gypsum *strata* are incomparably more massive, whilst the blocks of rock-salt are of much larger proportions[1].

---

[1] Mushketoff.—*Journal of the Imperial St. Petersburgh Mineralogical Society*, Part 12 of 1877, pp. 186—188.—*Author.*

Whilst noting the identity of the mountain formations here and in other parts of the Tián-Shán, Monsieur Mushketoff supposes a like character in the other deposits of rock-salt [1]. Besides the two above-mentioned beds of rock-salt in Turkistán, another very abundant yield is known to exist near the village of Samgár in the mountains on the right bank of the Sir-Daria to the east of Khojand and at a distance of 5 *versts* ($3\frac{1}{3}$rd miles) from the border of the Fargána Province. Here salt working is carried on by the natives in two places. In one of these Monsieur Mushketoff laid bare, amidst the gypsum, a layer of rock-salt, a block of which measured 40 feet long, from 20 to 30 feet wide, and about $4\frac{1}{2}$ feet thick. This deposit of rock-salt is the more remarkable, because it has the character and outward appearance of the famous green salt (Grünsalz) of *Velitcka* [2].

But the most famous salt throughout Turkistán is obtained in the Hissár possessions in the neighbourhood of the town of Guzár [3].

This salt is of a rose colour and agreeable to the taste. It is known locally as *Básh-Khurd* salt, and is largely exported to Kárshi and Sámarkand, whence it is transported to other points both of the Khánate of Bukhára and of the Turkistán Circle wherein it is designated "Sámarkand salt." The price of this salt in Sámarkand varies from $1\frac{3}{5}$ths *roubles* (about 4*s.*) to $2\frac{4}{5}$ths *roubles* (about 6*s.*), a *batmán* of 8 *puds* (= 288 ℔s). Locally it can be procured at the rate of 10 *kopaikas* (3*d.*) per camel-load or two *batmáns* weight (= 16 *puds* = 576 ℔s). In Táshkand it costs 50 *kopaikas* (about 1*s.*) *per pud*, or 36 ℔s.

The following points are worthy of attention as being localities wherein lake-salt is found :—

1. Lake Borogo-Basun, in the province of Semiraitchensk, near the eastern extremity of the Chuládir chain. This valley lies 5 *versts* ($3\frac{1}{3}$rd miles) to the south of the Kegen river, and presents the appearance of a flat crater surrounded on all sides by low ranges of hills, the formation of which consists of schist and porphyrite, with the exception of the southern slopes, which partake of the character of the salt-impregnated clays of the Chuládir chain. Lake Borogo-Basun lies at the western end

---

[1] The same, page 188.—*Author.*

[2] *Vide* Monsieur Romanovski's brochure regarding the investigations made by him into the locality of certain minerals of general utility existing in the province of the Sir-Daria.—*Author.*

[3] Quarries of this salt are worked in three places which lie at a distance of 20 *versts* ($13\frac{1}{3}$rd miles) apart: Liali-Khán, Bish Bulák-Khán, Karri or Konya-Khán. The Karri and Liali quarries are known to be of very ancient date. The older natives, who have heard reports of the opening in the Liali mountain of beds of rock-salt, say "that nature has herself brought people to these the richest of her yields; that at the foot of the Liali mountain, which is very steep and rocky, in old days barley and lucerne were sown, use being made, for purposes of irrigation, of the water of a stream which flowed from the hills contiguous to this salt-yielding mountain.

"That on to these peaceful fields a portion of the Liali mountain has been thrown and thus was formed a deep fissure, out of which burst forth a fierce flame which burnt up the juniper forest that grew on the mountain. That when the flame burnt out, in the chasm were observed pieces of the same rock salt, the Yaláma-Tuz, which is now being worked and which gives employment to so large a number of hands."

They say, moreover, that the "rivulet which used to irrigate the sown fields is now lost to sight in the chasm made, but that that river finally passes under the earth for some 50 *versts* ($33\frac{1}{3}$rd miles) and comes out near Fort Shirábád into the river of the same name." Hence they maintain does "the fresh water of the Shirábád-Daria receive, below the junction of this stream, a brackish taste."—*Author.*

of the crater above mentioned, and is of a very irregular configuration. Its waters do not exceed a depth of 28 inches, whilst in summer its bed is quite dry, leaving a deposit of salt on its surface about 14 inches deep. The bed of the lake is composed of a greenish salt clay in which are imbedded particles of pure salt. The thickness of this clay layer is about 14 feet.

The salt nature of this lake is probably due to the fact that salt springs flow into it from the salt-producing Chuládir mountain. This idea is supported, *1st*, by the actual existence of such springs; *2nd*, by the inexhaustible nature of the supply of salt in the lake in question,—a supply that a mere salt-impregnated soil could of itself never furnish, the more so as the amount of salt taken out is exceedingly large, for, besides the Kirghiz, the Russian settlers scattered over the environs of Lake Issik-Kul, along the valley of the Tekes and in the neighbourhood, as well as those in the Kuljan region, all make use of it. According to Colonel Kushakevitch, the salt yearly taken out of Lake Borogo-Basun amounts to 40,000 *puds* (1,440,000 lbs). A third reason for the above supposition lies in the complete geological analogy of the salt-impregnated clay, forming the bed of the lake, and of the upper crust of salt with the primary formations on the Kotch-Kur and other rivers. The deposits forming the bed of Lake Borogo-Basun and also the salt crust above may therefore be considered as brought down by the salt springs, which have been referred to. Thus, then, arises the natural alkalization of the salt and its appearance on the surface of the dry bed of the lake[1].

2. Salt springs near the hamlet of Kámish-Kurgán, in the province of Fargána, 80 *versts* (53 ⅓rd miles) from the district town of Chust. The origin of this salt deposit is analogous to that of the one just described. The Kámish-Kurgán salt springs lie in a ravine situated in low hills 8 *versts* (5⅓rd miles) from the above hamlet and 10 *versts* (6⅔rd miles) from the Sir-Daria. In order to obtain the salt, traders sink pits of different sizes in the ravine in question. After the pit has been dug to the depth of about 3½ feet, the water rises and covers the bottom to a depth of about 14 inches. The great evaporation that takes place during the summer dries up the water in the pits, and thus a layer of salt in the form of a crust is left on the bottom of the basin. This layer prevents the pit from becoming full of water again, but when the crust is stripped off, the water once more collects, and the process is repeated. The thickness of each salt layer is about 7 inches. If, during the excavation of a pit, water should not make its appearance soon, a channel is cut to the existing spring and the dug-out basin is filled from it.

Close to the salt springs which have just been described there is a hollow, on the surface of which salt is obtained through the evaporation of rain water which forms puddles in it. This water drains off into the hollow, and as it passes over the exposed salt, the incrustations get charged with the briny particles of the surrounding soil. Kámish-Kurgán salt is perfectly white and pleasant to the taste. On the spot it costs from

---

[1] Mushketoff.—*Journal of the Imperial St. Petersburgh Mineralogical Society*, 1877, Part 12, p. 189.—*Author.*

¾ths to 1¼th farthings *per pud* (36 lbs). Thirty cart-loads are daily taken away, and as each cart contains 25 *puds* (900 lbs), the amount removed daily equals 750 *puds* (27,000 lbs)[1].

3. In the neighbourhood of Lake Ebi-Nor and in its numerous estuaries, or, to speak more correctly, in the small lakes detached from it, such as Yan-Ho, Salt lake, &c. In such places the salt working in no way differs from that in practice in the numerous salt lakes in the south of European Russia. About Ebi-Nor the search is carried on by Chinese, and the salt obtained is exported to the Kuljan region. Such deposits will probably last for many hundreds of years [2].

4. In the Aulie-Ata district, to the north of the Kára-Tau range and to the west of the town of Aulie-Ata, in lake Ak-Kul and the country adjacent thereto. The character of this salt-supply is identical with that of Ebi-Nor. The salt is worked by nomad Kirghiz, and sold by them throughout the neighbouring country.

Notwithstanding the large salt deposits, in the country, both of rock and lake salt, the quantity obtained is all the same inconsiderable, being limited to some tens of thousands of *puds per annum.*

The population of the country, especially the Russian portion of it, demand not the local salt, but that which is exported from Russia, besides the Hissár salt, to which allusion has been made above. It would seem strange why, with such large salt deposits in the country, the Russian settlers should demand imported salt, which has to be brought over thousands of *versts*. Táshkand, for instance, does not use Samgár salt, deposits of which are found within less than 200 *versts* (133 ⅓rd miles), but prefers the article which is exported either from Russia, Sámarkand (Hissár salt), or that from the Aulie-Ata district.

The explanation of this is probably to be found in the fact that in Turkistán, and throughout Central Asia generally, trade is carried on by caravans which regularly move over certain defined tracks, and that these caravans import goods and all necessary articles of whatever kind. For the natives such caravans are the most convenient method of bringing from Nijni or from Orenburgh, amongst other articles, a given quantity of salt to be exchanged for the local productions. A caravan laden with native goods for Russia must of course, in returning, bring with it Russian produce since the camels have to be utilised in some way and the traders cannot come back empty-handed. But it is altogether another affair when a place off the caravan road is visited, for there the demand is so limited that it does not pay to hire camels and drivers to go to an in-lying locality situated out of the beaten caravan track.

Salt imported from Sámarkand is sold at Táshkand for 50 *kopaikas* (about 1*s*. 3*d*.) a *pud* (36 lbs) : that from the Aulie-Ata district costs 40 *kopaikas* (1*s*.) *per pud*. The same article imported from Russia is much dearer. It is sold by the pound and is used only by the more well-to-do people.

---

[1] These figures have been taken from the reports of the Commandant of the Chust District.—*Author*.

[2] Mushketoff.—*Journal of the Imperial Mineralogical Society* of 1877, Part 12, page 189.—*Author*.

CHAPTER XII.

SULPHUR.

Description of the sulphur-beds at Gogut-Kok Sai in the Province of Fargána—Examination of the question as to whether or not it would be advantageous to sink a shaft for the excavation of sulphur with a view to its export to Russia and to Europe—Sulphur beds in the Kon-Tág Mountains, in the Zarafshán Circle.

The best known sulphur bed in the Turkistán Circle is in the Province of Fargána. This bed is called Gogut-Kok-Sai. It lies 40 *versts* (26⅔rds miles) south-south-west of Khokand and 4 *versts* (2⅔rds miles) from the hamlet of Shár. Professor Romanovski thus writes of this bed in one of his journals: "here lie exposed sulphur marls studded almost throughout with veins of crystal sulphur ranging from crystal sticks to strata of pure sulphur about 6 inches thick. This remarkable bed has not, at present, been worked by any one; but its richness may be judged from the fact that detached blocks rich in the mineral are found lying about. These measure from 70 and 100 feet to nearly 600 feet across, and there are also on the same spot many pits and one large land-slip which is filled with water." Such a rich deposit of sulphur in the Fargána Province has given occasion to certain persons of authority to propose to sink a shaft for the purpose of getting at the sulphur, whence it would be exported to Russia.

In the opinion of these people the Fargána sulphur beds should be examined at the State expense with a view to settling the question—Can this discovered mine furnish sulphur to Europe, at any rate in such quantities as would be necessary for the manufacture of sulphuric acid and in proportions that would affect its use on a greater or less scale, for example in the working up, on the spot, of crude naphtha into kerosine?

It is known that the greater portion of the sulphur with which the entire world is supplied is obtained in Sicily. This article is found on that island in such large quantities that, in spite of the most antiquated apparatus used in the working of the beds and the decidedly uneconomical conditions involved, the yearly yield amounts to 12,000,000 *puds* or 200,000 tons.

For 100 *kilogrammes* (220 lbs.) of sulphur in the Sicilian ports, the price is 11 or 12 *francs* (from 9*s*. 2*d*. to 10*s*.), or about 1*s*. 9*d*. *per pud* (36 lbs). The excise charges amount to about 1½*d*. *per pud* (36 lbs); and the transport to France or England accounts for something under 6*d*. on the same weight.

Consequently a *pud* (36 lbs) of sulphur, which in the ports of Sicily costs 1*s*. 9*d*. when landed in either France or England, will be priced at something below 2*s*. 6*d*.

If we add to these particulars that during 1874 there were imported into Russia 415,321 *puds* (2,491,926 lbs) of grey sulphur at a cost of 494,790 *roubles* (£250,000), it follows that one *pud* (36 lbs) costs when landed in Russia about 3*s*. If, then, the cost alone of the transport of the same quantity of sulphur from the Province of Fargána to the town of Orenburgh amounts to 5*s*., it becomes perfectly clear that in no way would it pay to import Fargána sulphur either to Western Europe or even to European Russia.

But as concerns the question—can Fargána sulphur supply the local demands for sulphuric acid in any future factory for the preparation of lamp oils? it is known that for the clarifying of one *pud* (36 ℔s) of such oil not less than ½ ℔ of pure sulphur is necessary. Still, without the knowledge of the extent of production of such kerosine, it is difficult to fix, even approximately, the number of years the existing beds of Fargána sulphur would suffice for the process.

As to the establishment in Turkistán of a gun-powder factory, in which the locally obtained sulphur could be used, nothing need be said.

Another sulphur bed is known to exist opposite the Rabát settlement on the Kon-Tág mountain in the Province of Zarafshán; this mountain lies on the right bank of the Yagnáb river, but the settlement is on the left bank. On the Kon-Tág mountain layers of coal are in a state of combustion, which shows that the agent of combustion is grey sulphur, and this is collected by the inhabitants [1].

CHAPTER XIII.

NAPHTHA SPRINGS.

Wealth of naphtha springs in the newly incorporated Province of Fargána—First attempts of Russian traders to obtain naphtha and asphalt—Character of the naphtha springs situated in the Province of Fargána—Method of obtaining naphtha in vogue amongst the natives—Chemical analysis of Fargána naphtha—Hope as to the development of the naphtha trade throughout Turkistán.

The Province of Fargána, formed out of the former Khánate of Khokand which has recently been added to the Russian Empire, is famous for its numerous naphtha springs, and these will, in time, be one of the most substantial branches of industry in the Turkistán tract. Naphtha is scarcely worked at all by the natives. By far the greatest impetus to this produce was given by certain Russian traders (Thedoroff, Khludoff, Zakho, and Gromoff) who began to dig for naphtha in the Khokand Khánate as far back as the year 1868. The naphtha so obtained went to Táshkand and was there made into kerosine at a cost of 20 *kopaikas* (6*d.*) per ℔. Asphalt was also manufactured, for with this it was thought the roofs might be covered (the houses in the country having flat ceilings), so as to preserve them from leaking in the rains. An asphalt-covered roof costs at Táshkand about 3 *roubles* (7*s.* 6*d.*) per 50 square feet (nearly). Still from many causes the working of the naphtha in the Khokand Khánate by the Russians was very inconsiderable.

In the year 1875 the annexation of the Khánate of Khokand began, and in the following year it was completed. Subsequently the whole country was opened out to thorough exploration by Russian scientific men. In the same year the mountain portion of the late Khánate was brought under Russian administration, and Monsieur K. V. Gileff set out for the purpose of examining the naphtha springs, whilst Professor Romanovski explored the geological formation of the country.

---

[1] Aminoff.—"Military topographical sketch of the country on the upper course of the Zarafshán, pp. 6 and 71. *Vide Turkistán Annual*, No. 3, page 71. Monsieur Aminoff herein states that the Kon-Tág mountain is volcanic, but this is evidently an error.—*Author.*

Monsieur Gileff's investigations brought to light that the new Province of Fargána is very rich in naphtha springs, and that these, in many cases, can be seen at the bases of the higher ranges which shut in the valley of Fargána on nearly all its sides.

The naphtha springs which Monsieur Gileff looked at are situated :—

(1) In two places 50 *versts* (33⅓rd miles) to the north-east of the town of Námangán.

(2) East again of the above and to the north of the Andiján district there are springs on both banks of the river Maili at a distance of 25 *versts* (16⅔rds miles) from the hamlet of Isbaskand.

(3) Opposite the hamlet of Aim on the right bank of the Kára-Daria 30 *versts* (20 miles) east of the town of Andiján.

(4) 12 *versts* (8 miles) south of the town of Rishtán.

(5) Copious springs near the road between Khokand and the hamlet of Ispára.

(6) Springs 15 *versts* (10 miles) south of Fort Makhram.

All the naphtha wells which Monsieur Gileff examined lie at a height varying from 2,300 to 3,500 feet above the level of the sea.

The localities in which these wells are situate are forestless, and present no conditions at all suitable for agricultural purposes. The neighbourhood of the Rishtán naphtha wells is, moreover, quite destitute of running water. The exception to these conditions are the naphtha springs near the Aim hamlet. In this neighbourhood and on the right bank of the Kára-Daria are rice plantations. Wheeled communication could be opened out with all the sources of supply named, with the exception of those situated in the Námangán district, the last 15 *versts* (10 miles) of the road to which from the town of Námangán being suitable for pack animals only.

The daily flow of naphtha into the wells from all the known springs is not, at present, very great; the greatest quantity issues from the spring on the river Maili, and this amounts to 20 *vedros* (about 54 gallons) in the 24 hours. But such a flow of naphtha in no way indicates the wealth of the subterranean stores of the Fargána Province. Unworked sources which yield their 3 to 4 *vedros* (8 to 10 gallons) *per diem* would, were their wells to be worked with boring apparatus, give forth thousands of *puds* within the same time.

The naphtha of the Fargána Province issues from strata of lime and sandstone, and these strata abound in beds of shell, indicative of a tertiary formation. The naphtha finds its way with the water into the vein of clay, *in situ* in the lime and sandstone. Around all the issues of naphtha are seen greater or less sized detached pieces of hardened mineral oil.

Taking into consideration the vast extent (10 *versts* = 6⅔rds miles) over which the formations, described as being identical in a geological sense, lie to the north-east and south of the Fargána Province and also the sparse population in the neighbourhood of the hidden sources, Monsieur Gileff thinks it likely that in the Fargána Province there exist many more naphtha springs close to the surface than are known to the administration at the present time [1].

To the natives of the Fargána Province this naphtha supply has long been known, for the Kalmaks, who were at one time the ruling race, searched for it and, after them, the Sárts used naphtha principally as a medicine for the itch,—a disease which is very prevalent amongst the native inhabitants of Central Asia. Besides this, the Sárts knew how to make asphalt out of naphtha, but they used it solely to put on their foot coverings. They obtained the asphalt by steaming mineral oil in cast-iron vessels.

The native method of extracting naphtha is of the most primitive kind. Naphtha or mineral oil percolates drop by drop through the limestone. With it is salt water saturated with sulphureous hydrogen. The two together are made to fall into channels excavated for the purpose, and the naphtha which remains on the surface of the water is then collected. The water, on the other hand, is passed through openings made in the duct and flows into a stream or other channel, any naphtha that remains being filtered through twigs of mountain brushwood.

Fargána naphtha of the raw kind is of a brownish-black colour, with a greenish shade. Its specific gravity at a temperature of 17·5° Réaumur (= about 38° Fahrenheit) is 0·836.

Monsieur Krauze made an analysis in 1870 of the naphtha obtained on the river Maili. This showed the following results [2] :—

First distillation.

Temperature.	Specific gravity.	Percentage.
70° to 100°	0·750 colourless.	20
180 to 300°	0·790 ,,	15
300° to 400°	0·825 yellow.	50
Loss of gas and coke		15
		100

After clearing the naphtha with sulphuric acid and alkali, Monsieur Krauze carried out a second distillation, and this resulted as follows :—

Particles.	Specific gravity.	Temperature.	Percentage.
Naphtha	0·730	100°	5·5
Spirit	0·800	320°	52·0
Paraffine			32·5
			90·00

There are grounds for supposing that the naphtha working of Turkistán, in spite of its first failures, will receive considerable development, as a great demand arises for a light-giving material, an article of the first importance. The more so because stearine candles, for example, cost at Táshkand from 39 to 40 *kopaikas* (9*d.* to 1*s.*) per ℔; indeed, there have been times in which they have been sold for 1⅓th *roubles* (3*s.*), and when they have not been procurable at all, the Russian inhabitants being obliged to fall back upon the ordinary tallow candles of native manufacture. The transport of kerosine oil from Russia must necessarily be very expensive, in consequence of the difficulties attending its carriage. This, then, is the reason for our supposing that the naphtha produce of the Fargána Province has before it a great future.

---

[1] *Turkistán Gazette*, No. 35 of 1876.—*Author.*

[2] *Turkistán Annual*, No. 2, p. 446.—*Author.*

CHAPTER XIV.

MINING INDUSTRY.

General glance at the mining industry of Turkistán—Coal trade—Coal mines (*a*) in the Province of the Sir-Daria, (*b*) in the Kuljau region, (*c*) in the Province of Semiraitchensk, (*d*) in the Province of Fargána—Lead mining—Auriferous sands—Failures experienced by Russian traders in their search for gold in Turkistán—Search for gold by the natives—Iron, copper, and other mines.

Mining industry in Turkistán does not, as yet, exist, but the number of mines and of coal beds give us the right to suppose that it will receive future development.

To the category of useful minerals in Turkistán the following belong: gold, both in the form of auriferous sand and in mines; silver, lead, copper and iron, coal, rock and lake salt, sulphur, saltpetre and turquoise. The positions of all these minerals were known to the natives, and almost all of them have been worked, but in no case was the working on an extended scale, nor did the outturn attain to any considerable dimensions.

With the appearance of the Russians in the country, native industry in this direction was curtailed, but, at the same time, Russian experiments, which were conducted with small means and without proper knowledge, did not give the desired results. State investigations alone appeared of a more fruitful kind. Native industry had been confined to the searching for gold out of auriferous sand, to the working of the lead and iron mines, and to the acquirement of saltpetre and of lake salt. The last-mentioned production, as we have seen above, is now of the same dimensions as of yore, but although an article of the first importance it has not called forth competition on the part of Russian traders, and this because of the difficulty of transporting it to other places.

THE COAL INDUSTRY.

Coal beds are known to exist in the—

(*a*) *Province of the Sir-Daria.*

(1) *In the Tatarinoff coal mine.*—This mine is situated close to the Ak-Tasti-Bulák springs which fall into the river Boroldai. Works were at once instituted here under official supervision, and to the mine was given the name Tatarinoff, in honour of the mining engineer who discovered it. These beds of coal consist of several seams which have a dip 15° to the north-west. The seams lie in schistic clay intermixed with sandstone. The thickness of the seams is 7 feet 10½ inches.

The Tatarinoff coal mine lies 80 *versts* (53⅓rd miles) from Chimkand, 100 *versts* (66⅔rd miles) from Aulie-Ata, and 200 *versts* (133⅓rd miles) from Táshkand, and at the same distance from the landing stage on the Sir-Daria at the mouth of the Aris river. The forestless Sir-

Daria Province is always in want of fuel, and the supply of this amongst the natives is confined to dried-up garden trees and to *tezek* or manure. The influx of Russian inhabitants has increased the demand for forest material, and therefore the opening out of coal seams is of very great importance to the country. In order that enterprise might be hastened in this direction, it was decided that the first works should be started at the State expense. In consequence of this decision, and thanks to the favourable condition of the coal seams with respect to their working, in the spring of 1868 there were collected at the mouth of the Aris 25,000 *puds* (900,000 ℔s or 416⅔rd tons) for the steam vessels of the Aral flotilla, whilst in the autumn of the same year there were collected, for the navigation of the year following, 45,000 *puds* (1,750 tons), besides small quantities that were sent to Chimkand and Táshkand. In 1868 the total yield of the Tatarinoff mine amounted to 80,892 *puds* (about 1,350 tons), and in 1869 to 81,000 *puds* (or about the same amount). But because of a limited sale and the expenses incurred in the first starting of the mine, the price of the coal was high; at Táshkand it cost 32 *kopaikas* (9*d.*) a *pud*, or 36 ℔s. Hence the Tatarinoff or State-worked mine has resulted from the very first in a steady deficit, but at the same time it has done the country this service, *viz.*, it has preserved the garden trees from destruction.

The State working of this mine continued up to the year 1874, when the Engineer, Monsieur Gileff, was appointed head of the mining department of the Turkistán Circle, and he closed the works. The chief causes of his doing so were its remoteness (added to the impracticable road between Táshkand and the banks of the Sir-Daria) and the exhaustion of the seams in the locality.

Between the years 1867 and 1874 the state mine in question had yielded altogether about 300,000 *puds* (5,000 tons) of coal at a loss of about 65,000 *roubles* (about £6,500), whilst the average yearly output for the eight years amounted to 37,500 *puds* (625 tons).

2. *The Pervushin coal mine.*—This coal seam, discovered by the merchant Pervushin, is adjacent to Karam-Kul spring which falls into the river Chirchik through its left bank. The seam is 8 *versts* (5⅓rd miles) from the village of Khodjakand and 80 *versts* (53⅓rd miles) from Táshkand, where the coal is sold at 25 *kopaikas* (about 7½*d.*) per *pud* (36 ℔s). Notwithstanding that this description of coal is 7 *kopaikas* (2*d.*) cheaper than the State coal above described, the latter, being a better material for warming purposes, is the more economical article. In 1868 the Pervushin coal was stored at Chináz for the steamers of the Aral flotilla, but it was found to be unfit because the steam quickly fell off. Consequently this class of fuel came to be used exclusively in the wine distilleries close to Táshkand, which belong to the merchant Pervushin.

During the period embraced by four years the output of coal amounted to 400,000 *puds* (6,666 tons), after which the further working of the mine necessitated more complicated and difficult labour. This mine was therefore closed, and those who had been working it resolved to search for other seams in the neighbourhood. Seams have recently been discovered along the river Ugam.

3. *The Ugam coal seams.*—These lie 100 *versts* (66⅔rds miles) to the north-east of Táshkand and near the Ugam stream, which enters the Chirchick through its right bank. The outturn of coal here is less than 100,000 *puds* (1,666 tons) *per annum.*

4. *The Fovitski coal mine.*—This coal seam comprises several parallel layers which crop out on to the surface at the Kokine-Sai natural boundary, 55 *versts* (36⅔rds miles) south of Khojand. During the four years between 1868 and 1871, 105,000 *puds* (1,750 tons) were taken out of this mine. For the two past years (1868-69) of the existence of this mine the coal was sold exclusively at Khojand to private persons engaged in the silk-winding factory belonging to Monsieur Khludoff, and it was also served out to the troops. Subsequent to 1870, stores of coal were contracted for, for supply to the troops quartered at Khojand, Nau, and Ura-Tapa.

In the same year 16,000 *puds* (266 tons) of coal were ordered for the Aral flotilla. State orders made it possible for the mine to be kept going, but those from private individuals were too small and uncertain. The coal thus worked was stored at Khojand and Nau, which are distant from the mines 55 *versts* (36⅔rds miles), at Ura Tapa, 85 *versts* (56⅔rds miles) off, and at Irjár, 100 *versts* (66⅔rds miles) distant. At the three first-mentioned places the coal was stored principally in fulfilment of army contracts and for the troops stationed at those places. Its sale to private persons was on a very limited scale, since the natives had not yet taken to its use. Moreover, they preferred wood, because, as they have no stoves in their squalid abodes, they heat them during the cold season with wood charcoal, which is burnt in chafing dishes (*mangans*) of peculiar construction, and for these pit coal is not suited. The price of the latter on the spot was 10 *kopaikas* (3*d.*) *per pud* (36 ℔s), and in Khojand 20 *kopaikas* (60*d.*) for the same amount. During the events which preceded the war in the Khánate of Khokand, the enemy's bands flooded this mine, and consequently its working was stopped from the year 1875. Monsieur Fovitski, however, having received State aid, resolved to open fresh works close to his former mine.

Speaking generally, there is a great deal of coal in the Sir-Daria Province. The problem, indeed, consists in seeking for coal seams close to the settled points or *oases,* so as to facilitate and further its use. Professor Romanovski, after examining a considerable portion of the surface of the Province of Sir-Daria, came to the conclusion that pit coal can be found in the whole table-land between the towns of Táshkand and Turkistán, and likewise on the north-east slopes of the Kára-Tau range. He supposes that, within this area, seams of pit coal lie close under the upper and lower tertiary formations which, in the locality spoken of, are but slightly convex and but little worn.

(*b*) *The Kuljan region.*

The richest and most certain of the coal beds of the Kuljan region lies on the right bank of the river Ili, to the north-west of the town of Kulja. This has been worked by the natives in three places: Pelichi, Moguiti, Hotul, distant from Kulja 10, 15, and 20 *versts* (6⅔rds, 10, 13⅓rd miles) respectively.

The upper or 11 feet seam at Pelichi is now being worked with four shafts. The one at Hotul with 8 shafts. At Moguiti the seam is only 3½ feet thick and requires but 2 shafts. The coal of the upper layers is of an earthy character, and, when exposed to the air, quickly crumbles, and, on being burnt, leaves a quantity of ash. Hence it is exclusively used for heating purposes in dwelling-houses; whilst the coal from the lower strata is preferred for smelting and for metallurgical operations. It is fairly compact and of good lustre, and when exposed to the air does not crumble so readily as the coal of the upper seams.

The works are either entrusted to a *commune* of 8 Chinese workmen, on partnership principles, or else to 12 Kálmaks in the pay of Dungán or Taránchi capitalists. On the advice of one of the most experienced workmen a place is chosen which is suitable for the starting of the work. The spot having been selected, a vertical shaft is sunk, and with this is connected an inclined plane. The former is used for passing up the coal which is obtained, and the latter as the means of communication between the outer world and the subterranean excavations. The depth of the shaft is sometimes as much as 315 feet.

Prior to the occupation of the country by the Russians, the selling price of the pit coal was very low, *viz.*, 1 *kopaika* (about 1¼ farthings) *per pud* (36 lbs) on the spot, and double that amount at Kulja[1]. The reasons for this cheapness were: (*a*) the oppressed condition of the Kálmaks, whose labour was at times very heavy; this race being held at a very low estimation by the Taránchis and Dungáns, the conquerors of the country; (*b*) the absence of all attempts to strengthen the underground works or to remove the water from them; and (*c*) the extraordinary cheapness of articles of initial requirement.

Such is the remarkable cheapness of all food and such the extraordinary moderation of the Kálmaks, in matters relating to eating and drinking, that the maintenance of a working man costs about 3 farthings *per diem*, or about 7½ *roubles* (18*s*. 9*d*.) a year. Hence a workman can be hired for about 20 *roubles* (about £2) *per annum*, and 12 men, for 2½ years, for 600 *roubles* (say £60). The approximate figures describing the yearly output of coal in the neighbourhood of Kulja are represented by 300,000 *puds* (500 tons)[2]. Monsieur Mushketoff[3] thinks that the total amount of coal in this locality is so great that, were the output to be 20,000,000 *puds* (over 330,000 tons) yearly, the mine would last for more than 300 years, and that, if only 1,000,000 *puds* (over 16,660 tons) were removed yearly, the mine would continue to yield for 3,000 years. But when we estimate the coal supply of the Kuljan region, we should always bear in mind past and present fires which have consumed, are consuming, and probably will consume, still much more of the priceless wealth that now lies without a use.

(*c*) *Province of Semiraitchensk.*

The coal seams of this province are of fairly large extent. They stretch throughout Tarbogatai from Chuguchak westward to Sergiopol. Coal seams are visible in the Buám defile and in the Kopál district.

---

[1] A *pud* (36 lbs) of coal now costs in the bazaars of Kulja from 7 to 8 *kopaikas* (from 2*d*. to 2¼*d*).—*Author*.

[2] Monsieur Gileff's mining notes.—*Author*.

[3] *Journal of the Imperial Mineralogical Society of St. Petersburg*, Part 12 of 1877, page 180.—*Author*.

For the heating of the houses in the Province of Semiraitchensk pit coal is not yet needed, because the forests are of large extent, neither have factories nor workshops been started, and so mineral fuel will in all probability not come into use in this province for some time to come.

(*d*) *Fargána Province.*

In this province also there are very many coal beds. The richest of these lies on the right bank of the river Ak-Su (the upper course of the Nárin-Daria) at a level above the sea of about 2,000 feet. Here the seams number seven, and of these some have a thickness of over 4½ feet. Coal from these seams was by order of Khudoyar Khán, late ruler of the Khánate of Khokand, sent to his capital.

In the same province there are four other known deposits of coal, *viz.*, 100 *versts* (66⅔rds miles) to the north of Andiján, 120 *versts* (80 miles) to the east of the same town, 40 *versts* (26⅔rds miles) to the south of Khokand and to the west of the hamlet of Isfára. From this short review of the coal supply of Turkistán, it will be seen that this industry has scarcely started. In the completely forestless Province of the Sir-Daria the demand for mineral fuel, although limited, is on the increase. But of course, until workshop and factories are established, it cannot attain to any great proportions. The remoteness of the coal seams from the trading centres, the difficulty of the communications, the want of technical knowledge on the part of those who undertake such enterprises, are all obstacles to the rapid development of the coal industry.

During recent years and in connection with the proposed railway to Táshkand, the mining department has used every endeavour to search out coal seams in localities near which the railway would pass.

No doubt such a railway by increasing the demand for mineral fuel would give a stimulus to the working of it in Turkistán. At present the output is confined to the modest figures 400,000 *puds* (6,666 tons) *per annum*, of which 300,000 *puds* (5,000 tons) are raised in the Kuljan region and only 100,000 *puds* (1,666 tons) in the Province of the Sir-Daria[1].

---

[1] In the month of October 1876, Monsieur Gileff examined a coal seam lying 100 *versts* (66⅔rds miles) from Chimkand, on the Chakpak stream, and on the post-road to the town of Aulie-Ata, between the Chakpak and Ters stations (7 *versts* or 4⅔rds miles from the former).

This seam lies between sandstone and conglomerate, resting on the old schists and sandstones which between the Kuyuk and Tulke-Básh Stations form a high heap at the end of the Kára-Tau range.

The coal seam lies too at a level above the sea of from 3 to 3½ thousand feet; the height of the stations on either side of it being about 2,000 feet.

From the small cropping out of coal, observed by the Kirghiz, it might have been supposed that there exists a seam at this spot which was previously unknown.

Unfortunately, however, further examination of the Chakpak-Ters coal seams have not justified this hope.

If it could have been shown that further exploration of this mine could be carried out with no great loss, then with a view to the preservation of the *Saksaul* growth on the banks of the Sir-Daria, a *desideratum* of growing importance, the Chakpak seam could, thanks to the existence of wheeled communication, have done much to meet the requirements of the Aral flotilla, and this because it lies only 200 *versts* (133⅓rd miles) from the junction of the Aris and the Sir-Daria.—*Author.*

Lead Mining.—During the existence of the Khokand Government, lead mining was carried on on the Kok-Kiya peak of the Kára-Tau range which towers near the town of Turkistán. Very rich veins, principally oxydised, fill the clefts in the limestone. The most brilliant epoch of lead mining was during the defence of the Khánate of Khokand against the Russians, and this though the outturn never reached any great dimensions and the system of working was extremely disingenuous. At the surface, where the lead cropped out, a pit something like a shaft was dug, the direction of which was regulated by the position of the richer and softer deposits, or of those whose working was the more practicable. The lead thus found was packed on asses and removed in bags to a small spring near the mines. Here the ore was subjected to a very rude process, without which the ore yielded 50 per cent. The miners then set out for a forest in the mountains, and here they burnt some charcoal and then proceeded to construct small furnaces out of clay into which air was pumped by bellows propelled by hand. The filtration of the lead at the spring was thus completed by the use of charcoal at the furnace. The results, so obtained, were lead with an impure surface, because of its fusion in clay and slag, mixed with 31·15 per cent. of pure metal. If, then, we follow the whole operation from the discovery of the mine to the extraction of the lead, we shall see that the loss of metal is enormous, for only the softer and richer ore is recovered, the rest being cast aside. Furthermore, in the transport to the smelting place, much ore is lost by chafing through the interstices of the bags, whilst the washing, which should have for its object the removal of all inflammable material, is made to result in great loss since the water for several *versts* is impregnated with leaden ore, and lastly the fact of slag, containing 31·15 per cent. of pure lead only, finally condemns the whole process of the extraction.

Since the Khánate of Khokand has become an integral part of the Russian Empire, the natives have considered lead mining an unprofitable undertaking. For local needs lead was only used in the form of bullets. Russian Artillerists do not use native lead because of its impurity. The local traders have therefore sold their mine to the merchant Pervushin, who undertook, in the year 1869, to store in the artillery administration of the Turkistán Military Circle 3,000 *puds* (50 tons) of lead at 3 *roubles* (7*s.* 6*d.*) *per pud* (36 ℔s).

The contract was, however, never fulfilled in consequence of want of knowledge as to how to work the mines. And so, State aid being withdrawn, Monsieur Pervushin's lead enterprise immediately collapsed.

Auriferous Sands.—Central Asia was known, in the beginning of the 18th century, as a gold-producing country, and report stated that the gold there procured, was river, *i.e.*, of the kind borne down by the flow of water, together with the sand and silt of the particular river. This news, indeed, of the gold washed down by the Amu-Daria was what principally induced Peter the Great to undertake a movement towards Central Asia,—a country which was, in his day, so little known that Yárkand, in the neighbourhood of which it was said that Kálmaks and Chinese searched for gold, was supposed to be situate on the river Amu-Daria. This, then, was the cause of Peter the Great's equipping expeditions in the hope of obtaining possession of the gold-producing localities of Central Asia. One of these expeditions was under the leadership of Prince Alexander Bekóvitch Cherkásski and proceeded to the mouths of the Amu-Daria with orders to proceed up that river to the town of Yárkand! Another set out from Southern Siberia to the same town, and this was commanded by Bukhholts, Captain of the Emperor's Guard.

Neither expedition, as we are aware, succeeded in its object. Prince Bekóvitch and his party perished at Khiva, whilst Bukhholts, after many privations, obtained possession of the central course of the great Siberian river, the Irtish, and, by erecting on its banks several forts, thus laid the foundation of Russian advances in the Cis-Irtish countries, as far as Lake Zaisán.

Bukhholt's expedition did not, indeed, discover for Russia the gold-producing countries of Central Asia, but his route opened the way by which Russian progress soon advanced to countries so richly endowed by nature. The first gold-producing localities were met with along the river Tentek, which flows out of the Djungárian Alatau, and which belongs to the system of Semiraitchensk, *i.e.*, to the system of the seven rivers which empties itself into lake Balkhásh. Report said that on the river Tentek were struck veins of virgin gold from ¼ to ½ inch in thickness, whilst all the silt of the same river contained, according to the same rumours, nuggets of large grain. These yields were worked by Chinese and Kálmaks with such assiduity as to pass into very proverbs of patience, for so great were their personal exertions that they succeeded in gaining gold where other searchers met with nothing but disappointment. As soon as the country along the Tentek and the other rivers of Semiraitchia was incorporated in the Russian dominions, the former gold-searchers, whether Chinese or Kálmaks, were ejected and the gold-producing region was taken up by Russian traders. Monsieur Kuznetsoff thus acquired Kizil-Togai, which is on the Tentek river. But with the removal of the Chinese disappeared also all the wealth of gold with which the country had been said to be endowed. In spite of every favourable condition for gold-washing, *viz.*:—

(1) the proximity of the gold veins to the surface of the ground;
(2) the small quantity of clay in the sand, an influence which bears on the ease or difficulty of the washing process; and
(3) the good quality of such gold as there was, the sands brought in nothing but disappointment, and this may be ascribed to the fact that there was not much gold in them. In 1868, Monsieur Kuznetsoff began to establish washings on the river Argaiti. But in this locality too the amount of gain fell far short of the sum expended in working.

In like manner the much extolled gold veins along the Talas, Ters, Chirchik, and Zarafshán far from justified the hopes of those Russian gold-searchers who, after long and protracted searching, did not at length find any gold-bearing sand. The Russian system of searching for gold is in such sharp contrast to that followed by the natives of Central Asia that the former could never succeed in extracting metal from such sands as might furnish, if not wealth, at least daily bread for the native searchers. Both in China and in Central Asia gold searching is carried out by any one without the slightest supervision or Government permission, and is subjected to no sort of control. Thus a poor man, who has not the wherewithal to hoe, sets out for such a place as he knows from former working contains gold, or he may even hit upon new veins. In either case his primitive method of searching will enable him to find at least some grains of the precious metal.

Sometimes small *communes* will be formed for gold-searching operations, and the yields will then be sold in the nearest market. Were the labour thus expended appraised at its proper value, the price of the gold obtained would be enormous. But as metals have a fixed price (it is only in certain countries that they are subject to fluctuation), the natives sell their gold either at market rates or even below them, and this because those who buy will only do so at a profit. Hence the searchers, who are often, too, the traders in gold, do not receive profit in proportion to their toil. Often, then, it happens that work extending over several months and of a heavy nature will give subsistence for but a few days only. In China, rich people make conditions with the poor searchers of such a kind that the former take from the latter all the gold washed out by them during the summer. For this they have to feed and clothe the searchers for the entire year. It is clear, then, that such a system cannot be advantageous to Russian traders, who by hiring people would thus lose capital which should recoup them and bring in some rate of interest.

The rude method of gold washing in Central Asia may be thus described :

The buddle used by the natives is a convex wooden frame made of fine willow poles, the projecting portion being bent to an angle of about 35°. Across this frame are inserted rows of finely cut twigs very close to one another. The frame is about 4½ feet high and 14 inches wide.

The frame is then securely fastened to the ground and an ordinary coverlet or carpet is stretched across it. The washing of the auriferous sand now proceeds. In order to retain the gold which may be of a higher specific gravity than the rest, cords of thick horse hair are sewn across the length of the carpet or coverlet. To the material thus spread out adheres the gold-bearing earth or sand. This is then washed in water and stirred with a small stick, with which too any reeds and other matter are thrown on one side. When by such a process 8 or 10 *puds* (from 288 to 360 lbs) of sand have been washed, they begin to scrape off the coverlet all that has stuck to it. To do this the coverlet is removed from the frame and rolled up and subjected to washing. A wooden cup in the shape of a boat and of the same width as the rolled up coverlet inside it is taken up and dipped into the water of some small inlet of the river, where the current is not strong. Having washed each fold of the coverlet in turn, all that has remained in it after the first washing is placed by the workman in the bottom of the cup.

The coverlet being now quite clear of any sand or mud, the workman takes the cup out of the water and by sharp spasmodic movements of the hand from right to left splashes the water out of the cup and with it the lighter particles of sand. From time to time he adds more water to the cup, and for several successive hours of untiring labour, continues the operation. In proportion as the gold in the cup becomes freer of foreign matter and the more light adulterations, the movements of the workman become more skilful and cautious. His problem is to leave in the cup the pure gold alone, however inconsiderable the quantity thereof may be. When the washing is completed the workman by dipping his finger into the water lets into the cup a drop of water which is used to draw out and to convey the washed gold to a small China cup. The work of one day is then finished.

Copper, iron, and silver mines exist in many parts of Turkistán. The working of these mines has been described in Vol. I of this work, but a detailed enumeration and description of these and of any other mineral productions are given in Monsieur Mushketoff's work entitled "Short account of a geological journey in Turkistán," *St. Petersburgh, 1876.*

CHAPTER XV.

METALLURGY.

Export of metals from Russia to Central Asia—Smelting of Russian cast-iron by the natives—Local iron foundries and workshops—Manufacture of sword blades and *kinjáls*—Manufacture of fire-arms by the natives—Manufacture of copper articles—Gun-foundries—Silver and gold articles—Native gold, silver, and copper money—Chinese *yámbas*—Return of the prices obtaining in the town of Táshkand for various metal wares.

Metallurgy in Turkistán has not got beyond the requirements of the blacksmith's calling. The causes of this lack of development have been, *1stly*, the absence of mining crafts; this has been the chief reason; 2ndly, the want of factories and workshops, the establishment of which would have stirred up the lack of the requisite material. The metals of Central Asia have always been received from adjacent countries and particularly from Russian territory.

From Russia such metals have been furnished in the most varied forms, *i.e.*, in molten shapeless lumps, in worked up articles, in the form of money, &c., &c.

Monsieur Rostorguyeff has imported and still imports cast-iron in the shape of vessels principally from the Kostinski workshop on the Ural river. Such of these vessels as have become worn-out are either mended or melted up by the natives. The latter process is carried on in the most primitive fashion; a furnace is constructed like a blacksmith's forge, and the inside of this is smeared over with a layer of fire-proof clay (*glibuta*) about 1¾ inches thick; into the furnace is now thrown the vessel, a blast piece is then fitted into the back wall of the furnace so as to project immediately over the upper edge of the vessel. Air is produced and passed through the nozzle of the blast piece by means of two pairs of inflated skins worked by hand.

The nozzles of the bellows are directed to the bottom of the vessel. The stems of the bellows are made of fire-proof clay mixed with camel's hair. The skins are of goats' leather and have two air valves. A workman takes his stand between the two pairs of bellows, which he works unceasingly with either hand, thereby producing an almost ceaseless current of air. Before the melting process has begun, several pieces of redhot charcoal are placed underneath the vessel, the inside of which is filled with raw material of the same kind. Above the vessel too are placed fragments of iron slag weighing from 18 to 72 lbs; the blast is now set in motion. As fast as the charcoal becomes red-hot, the slag heaped up above the vessel melts, and at the top of the vessel is again piled up charcoal and slag in the same proportions as before. A similar process is repeated until the vessel is filled with red-hot charcoal. The pumping in of the air now ceases, the unburnt charcoal is raked away, and the iron slag is cleared off the top of the vessel which is seized with iron tongs and taken out of the furnace. The melted mass is now scooped out with iron ladles and poured into a mould of fire-proof clay. These moulds are made up with slime and silt and then smeared over with a black substance composed of soot and flour, upon which is sprinkled very finely pounded and sifted charcoal dust. Such moulds are made upon the floor of the foundry. The molten material of articles, which are to be of a complicated shape, is poured into wooden moulds.

Amongst native workmen there are good moulders. They cast, with a fair amount of skill, various articles for themselves and also for sale to the Russians, such as vessels, wash-hand basins, *Kungáns*, *Viujki*(*?*), small doors and grates for stoves. But none of these things can be compared with the cast-iron articles manufactured in Russia. The finish of articles of native workmanship is not clean; their surface is rough, and they are moreover brittle.

These flaws arise from the fact that cast-iron, as used by the natives, is never sufficiently melted, and this arises (1) from the too weak blasting force, and (2) from the method of the fusing, during which so much time is wasted in cleaning the vessel of slag and charcoal and taking it out of the furnace that the molten metal has time to cool to a certain extent. In consequence of these underlying causes, cast-iron of native manufacture (such as doors, *Viujki*(*?*), wash-hand basins and gratings for stoves) are bought only by private individuals; the Russian Engineering Department of Turkistán preferring to write for those required for State purposes from European Russia.

The same remark applies to wrought-iron productions. All such are worked up by the natives from Russian joist and bar iron and steel by means of hammering.

The method itself of hammering iron is the same as in Russia, but on account of the dearness of wood and of charcoal, the native blacksmiths use these articles so sparingly that frequently the metal is not properly heated, and so there are not unfrequently flaws in their iron manufactures. Moreover, these articles are far from durable, and being carelessly made are wanting in finish. Their cheapness indeed constitutes their chief and perhaps their only merit.

But there are in the country more skilful workmen who know very well how to imitate Russian workmanship and who can give their manufactures some kind of finish. Such, however, are very few in number. Articles of the better description they make only to order, and such orders, on account of the general capriciousness of natives, are given but seldom. In the bazaars the better class of more carefully prepared wares are not exposed for sale.

Speaking generally, amongst the Sárts this branch of manufactured goods is at a very low point, and nearly all their cutting instruments, such as knives, scissors, razors, &c., are made of ordinary iron without polish, whilst the edges are ground on a coarse stone. If the knives be made of steel (and this is sometimes of the kind known as Damascus), such will be very rare and very dear, *viz.*, from 3 *roubles* (7*s*. 6*d*.) and upwards.

The usual bazaar prices for knives are from 20 to 30 *kopaikas* (6*d*. to 9*d*.) ; for razors and scissors from 5 to to 10 *kopaikas* (1½*d*. to 3*d*.).

Carpenters' and joiners' tools are of steel, and are made more carefully.

The once famous Asiatic sword blades completely falsify their former reputation. Native sword blades as well as other cutting instruments are made either of iron or very bad steel. The natives say they prefer such to blades of well-tempered steel, because they do not break or get knotched. If, moreover, on account of the softness of the metal of which they are made, their blades become either bent or blunt, they think nothing of it because every native carries about with him a small grindstone, and on this he leisurely repairs the damaged blade.

Still some good blades are to be found amongst both Kirghiz and Sárts. Such weapons are highly prized and pass as heirlooms from father to son, and are not readily parted with. Good blades are imported from Persia. These are for the most part made of Damascus steel or are forged from iron wire fused with charcoal. This method of preparation gives to the metal great toughness and elasticity and prevents any brittleness. Damascus steel bears a very high price in Central Asia. Sometimes this metal is broken and then it is melted up and new blades manufactured, but these do not, however, always retain their former qualities. The town of Hissár[1] is principally engaged in the manufacture of this class of goods. In Sámarkand, too, there are workmen who know how to prepare this kind of blade, but they are very few in number.

There are other ways too of manufacturing sword blades. For instance, a blade of soft steel is taken and on its edge are welded in succession a lot of English needles. When a sufficient quantity of these have been used, both metals are carefully forged together. When this amalgam has been sufficiently mixed, the edges are once more tempered. The result is a basis of soft steel with a highly tempered edge of English steel. If the amalgam has been heated to a high temperature and the forging carefully conducted, the sword blade resembles the most highly tempered edge that can be produced, and such blades turn out very satisfactorily. They stand being bent, and the shock of side blows, whilst their tempered edges preserve their sharpness for a long time, cut well and withstand a cutting blow. Should, on the other hand, the forging be bad and the union of the welded metals imperfect, then on the blade being bent the edges will often come away from the blade and leave a jagged surface.

Yet another method of manufacturing sword blades is carried on, and this very closely resembles the process of preparing blades at Toledo, in Spain. Blades are forged from horse-shoe iron or nails ; on these are laid two other fine blades of good steel (laminated or better still of English needles). The degree of curve of all three blades must be the same. The iron blade is placed in between the two steel blades in such a manner that the edges of the latter are made to meet. All three blades are then welded together and carefully forged. Therefore when the edges of the steel blades have accurately met, the edge of the welded blade will also be of steel.

---

[1] The Hissár workmen really live in the town of Kára-Tág 24 *versts* (16 miles) from Hissár. Their Damascus blades cost from 40 to 45 *roubles* (£5 to £5-12-6*d*.). See Mayeff's sketch of the Hissár Khánate.—*Author.*

When such blades have been skilfully forged and made of good materials, they furnish a very good fighting weapon, because the blade will not break, whilst its edge is a firm one. But such skilfully prepared blades are of great rarity.

In outward form native blades are of two kinds, curved or sabres (*sáblia*) and straight (*sháshka*). The former have a very great curve, the bend being especially so at a distance of two-thirds *arshin* (?) (about 18 inches) from the handle. This is the part of the blade which bears the force of a blow, the direction of which coincides with the lie of the edge or at any rate forms a very slight angle with it, the blow received being of a cutting or most effective kind. In this respect the shape of Asiatic blades are fashioned for this purpose much better than are European swords.

The handle is usually made of horn, wood, or ivory, with a cross piece. The end is turned up and is grooved, the hollow being filled with a sword-knot.

The balance is so calculated that the centre shall lie between the centre of the blade and its curved portion. By this arrangement the centre of gravity of the blow becomes much stronger.

The scabbard is, as a general rule, of wood tipped with metal. The convex side is thinned off a little, so that the excess of the curve may not hinder the entry of the blade into the scabbard.

Many of the best sabres have a very expensive setting of gilt, in which are imbedded turquoises and other stones.

The straight swords are of two kinds, *viz.*, for pointing and cutting. Both kinds, as regards the quality of their metal, are generally worse than the curved sabres. The hilts are straight and without a cross piece. Their blades widen towards the handle into which they are sunk. The centre of their balance is nearer the handle than is the case with the curved blades. *Kinjáls* (daggers) are met with but very seldom, since long blades being more generally used, the former are found to be ineffective as a defensive weapon.

Afghán sabres differ from Sárt in their greater length, less curve, and in their very much handsomer shape of handle. The handles of the former make are generally of iron with a very large and handsome boss which is bored through so as to receive silken tassel. They have cross pieces with bevelled edges.

To determine what is the production of hand weapons throughout the Khánates of Bokhára and Khokand (now the Russian Province of Fargána) would be very difficult, as that manufacture is not subjected to any sort of check. When a war breaks out the orders come in so fast that the workmen scarcely cease to work, whereas in times of peace the same craftsmen either sit idle or, failing the demand for hand weapons, occupy themselves in making knives or carpenters' and joiners' tools, bits, stirrups, &c. The weapon makers in fact become sellers of all sorts of iron ware.

Native Governments never used to give orders for the arming of their troops, each soldier having to arm himself.

In Sámarkand, during Bokháran rule, weapons were exposed for sale at fifteen shops, but those of only six were considered to be of a good kind. Now the natives of Turkistán manufacture only a limited number of cold steel weapons, and those only with the permission of the Russian officials. Amongst Russian officers, for the Cossack manœuvres swords have come into use, with horn handles and wooden scabbards cased in goats' leather. Such swords are light, convenient, handsome, and by their cheapness enable the service sword to be kept for full parades and certain other occasions. A full dress sword costs at Táshkand about 9 *roubles* (£1-2-6), whilst one of native manufacture can be had for 3 or 4 (7*s.* 6*d.* to 10*s.*).

The latter are worn by Russian officers suspended in leather belts from the shoulder, but this method of wearing them causes the uniform to get much chafed when the officer is mounted. Hence many officers when on horseback wear the sword round the body and under the tunic.

Sárt muskets have, generally speaking, flint locks, the barrel being nearly always of European workmanship, but of an antiquated pattern. Many are imported from India. But native-made barrels are also met with, though few in number. The workmanship of these is imperfect, and they are pirated imitations of European patterns. The stocks and flint-locks are all of native make. The former are very varied as to form, but are very slender and with a pronounced bend. At the butt end there is no widening. The flint-locks consist of one bent spring only. One end of this serves as a hammer, and the other, in shape like a claw, holds the flint. Sometimes a wooden prong is fixed on to the stock, and this serves as a rest when shooting.

Fire-arms amongst the natives are of two kinds :—

1. Heavy fort weapon or falconet (*jizail* or *salishkán*), which is very long, of large calibre (from 1 to 2 inches) with a very massive stock. This kind is fired from fixed rests. The balls discharged from it are generally of cast-iron and occasionally of lead.

2. A lighter weapon (*multik*), which is of various calibres and sizes, from 1 inch and under. The bands of the barrels are thick, and the barrels themselves are very long. The heavier kinds have rests attached to them.

Weapons on the European system are met with, with percussion locks and rifled barrels.

Copper articles are cast by the natives sometimes from Russian red copper and sometimes from Russian manufactured articles that have become unserviceable. The smelting and the casting are carried on in the most primitive fashion, and of the things manufactured only the wash-hand basins (*kungáns*) have any degree of beauty.

In the independent Khánates they manufacture cannon out of copper. But when they do so, no attention is paid to uniformity of material. Everything is melted up, whether copper or brass, and hence it follows that the several portions of the gun are of a different casting.

Of the nobler metals they use silver largely for working up into all the articles of female adornment, such as earrings, bracelets, broaches, rings, &c., and likewise for ornamenting horse trappings and appointments.

Gold workmanship in Turkistán, as throughout Central Asia, is very little practised. For it are substituted coral (from India), pearl, lace, tinsel, &c. Such gold as is found goes almost exclusively to be coined up into *tillas*. These coins are not of a uniform size, pattern, or value in the several Khánates (Bukhára, Khiva, Khokand now the Russian Province of Fargána). Thus the Bukháran *tilla* weighs 69, 69½, 70, and 70½ grains or almost one *zolotník*[1], and is received by the Russians as the equivalent of 4 silver *roubles* (about 12*s*.). The Khokand *tilla* which is of somewhat less weight equals 3⅘ths Russian silver *roubles* (11*s*. 6*d*.). The Khivan *tilla* is of still lower weight, and is the equivalent of 3½ Russian silver *roubles* (10*s*. 6*d*.).

It will here not be out of place to make mention of other coins which are used in Central Asia. Silver coins are called *tangas*. Bukháran and Khokand *tangas* have an average weight of 50 grains, and are equal to about 20 silver *kopaikas* (about 7*d*.), *i.e.*, 5 go to make up a Russian silver *rouble* (about 3*s*.). Khivan *tangas* are somewhat larger, so that 16 Khivan *tangas* equal one *tilla*. The Khivan *tanga* equals the Russian 20 *kopaika* silver piece (6*d*.).

Copper coins are called *puls*. In the Bukháran *tanga* there are 44 *puls* ; in the Khokand from 24 to 25 ; in the Khivan from 40 to 42 and even 45.

In the Kuljan region Chinese money is used, *viz*., gold and silver *yámbas*, and also a small coin of fluctuating value, the copper *yármak*.

Yámbas are bars of gold or silver shaped like a canoe and embossed with the sovereign's profile. They are valued at from 3 to 120 *roubles* and even more (7*s*. 6*d*. to £15).

Yármaks are of very low monetary value. Thus 125 go to a *kopaika* (or 100th part of a *rouble* = ¾ths of a farthing) and 12,500 to a *rouble*. The *yármak* is a round coin with a square hole cut in the middle. It is strung on a cord, and thence passes into circulation.

In consequence of the undeveloped state of the mining and metallurgical industries of Turkistán and of Central Asia, generally the necessity is apparent of importing all metals and metal wares from Russia. Such articles are transported thither principally from the Ural, and the route taken generally lies through Troitsk. Thence they go by the caravan roads into Central Asia, part being diverted to Khiva, part to Bukhára, and part to Táshkand. Such metals and metal wares as are taken to Khiva and Bukhára are again distributed from these centres and so pass to all the towns of those Khánates and to Táskhand and even to Khokand and other points of the Turkistán Circle. Hence to indicate the average prices for such articles in the Turkistán Circle it will suffice to speak of Táshkand only, because any variation in price at other places will depend on the cost of carriage only. In the table which is appended the prices of such articles are shown for the year 1876.

---

[1] A *zolotník*=2·40 drams.—*Translator.*

RETURN.

Price current of the various metal wares in the town of Táshkand—

Name of article.	Quantity in *puds*.		Roubles	Prices. £	s.	d.
NAILS.						
Joist 4-inch	(1,200 to the *pud*)	(36 lbs)	11[1]	1	7	6
„ 5 „	(800 „)	„	10	1	5	0
„ 6 „	(560 „)	„	9	1	2	6
„ 7 „	(400 „)	„	10	1	5	0
„ 8 „	(300 „)	„	9	1	2	6
„ 9 „	(250 „)	„	8	1	0	0
Shingle nails	(4,400 „)	„	16	2	0	0
5-inch fasteners	(100 „)	„	8	1	0	0
10 „ tile fasteners	(75 „)	„	8	1	0	0
8 „ Semi-naval	(100 „)	„	8	1	0	0
Ladder pegs 2-inch	(6,000 „)	„	16	2	0	0
„ 3 „	(2,000 „)	„	11	1	7	6
„ 4 „	(1,200 „)	„	10	1	5	0
„ 5 „	(800 „)	„	9	1	2	6
„ 6 „	(560 „)	„	9	1	2	6
„ 7 „	(400 „)	„	9	1	2	6
3-inch tile fasteners	(3,000 „)	„	12	1	10	0
5 „ „	Per *pud*	(36 lbs)	12	1	10	0
Cooper's nails	(4,000 „)	„	14	1	15	0
BOLTS.						
2-inch round-headed	(5,000 „)	„	14	1	15	0
3 „ „	(2,000 „)	„	11	1	7	6
4 „ „	(1,200 „)	„	10	1	5	0
5 „ „	(800 „)	„	10	1	5	0
6 „ „	(560 „)	„	9	1	2	6
7 „ „	(400 „)	„	9	1	2	6
Dross	(20,000 „)	„	23	2	17	6
Horse shoes	(3,000 „)	„	16	2	0	0
Tapestry	(30,000 „)	„	20	2	10	0
Rough castings	(13,000 „)	„	15	1	17	6
Machine			16	2	0	0
IRON.						
Bar	Per *pud*	(36 lbs)	3⅘	0	9	6
4 grain			4	0	0	0
Square joist			4⅛	0	10	0
Hoop, 2 roll			4½	0	11	3
„ 3 „			4⅛	0	11	3
Sheet, black			5⅘	0	14	6
„ white			20 to 40	2	10	0 to £ 5
Pot			10	1	5	0
Round			4	0	10	0
Hoop			5	0	12	6
Hammer			3⅘	0	9	6
Engraved			3½	0	8	9
Alambic			3	0	7	6
Rod			6	0	15	0
Plate, white			20 to 40	2	10	0 to £ 5
IRON WIRE.						
Stove	Per *pud*	(36 lbs)	15	1	17	6
Glazier's			16	2	0	0
Roof			16	2	0	0
COPPER WIRE.						
Brass			30	3	15	0
Binding			29	3	12	6
English steel			16	2	0	0
Russian „			6	0	15	0

---

[1] In January the price was 16 *roubles* = £2.——*Author.*

Name of article.	Quantity in *puds.*	Prices. *Roubles.*	£	*s.*	*d.*
NAILS.					
Packing case, iron, coarse, with bolts and pins	Per lb	16	*Kopaikas.*		
Do. Do. fine, with screws and nuts		16	...		
Pewter, English	Per *pud* (36 lb)	40	5	0	0
„ ordinary	„ „ („ „)	16	2	0	0
Lead in pigs		not on sale.			
„ sheet					
Solder, copper	1 lb		0	2	0
Brass, sheet	1 *pud*	16 to 22	£2 to £2-15-0		
„ red	1 „	18	2	5	0
„ latten	1 „	25	3	2	6

CHAPTER XVI.

BUILDING MATERIAL IN TURKISTÁN[1].

Characteristics of the building trade in the Turkistán Circle—Quality of building materials—The poplar, fir, *Káragátch*, *Chinár* or plane, Mulberry and Willow, Wild Olive and others—Coefficient of resistance of the wood of the various kinds of Turkistán trees—Reeds—Straw—Potters' clay—Sun-dried bricks—Kiln-baked bricks—Gypsum—Lime—Sand—Asphalt.

Building, like all other work in Turkistán, is under conditions totally different to those in European Russia. Its chief characteristic is the complete absence, in the greater portion of the country, of building wood and stone. It is true that the fir grows in the mountains of the Semiraitchensk Province, but the Russian settlements scattered over the larger area of the bases of those hills have destroyed the forests to a great extent, so that, as we have stated before, the Local Administration, in order to preserve the mountain forests and to prevent the destruction of the seedlings by fires, has altogether prohibited building timber to be used either in the towns or the settlements. In consequence of this interdict both in the Semiraitchensk Province and everywhere throughout the Sir-Daria and Fargána Provinces, in the Zarafshán Circle and the Amu Daria section, all buildings, both State and private, are principally constructed of sun-dried bricks, and for the wood work poplar is used, a timber which is usually held to be unfit for such a purpose on account of its want of strength and durability. In the Province of Semiraitchensk, in place of the poplar, the mountain spruce fir is allowed to be bought for all little jobs.

In addition to the poplar, and in Semiraitchia the spruce fir, they use, for building purposes, other kinds of trees, of which the greater number are cultivated in gardens and orchards near the dwelling-houses. Amongst these are the willow, dwarf elm, plane, mulberry, and wild olive (*jida*). Of the trees found in the mountains of the Sir-Daria and Fargána Provinces and in the Zarafshán Circle the *archa* or dendroid juniper is also used for building purposes.

The poplar (*Populus Sp* or the native *Terek*) furnishes, as we have said above, almost the sole building timber in the Sir-Daria and Fargána

---

[1] In the exposition of this article I have chiefly availed myself of Monsieur N. V. Bogayevski's excellent article which appeared in the *Engineering Journal* for 1874, No. 8. This article is the sole basis for an acquaintance with the building timber of Turkistán. Apart from this article some short notes appeared in the *Turkistán Gazette* of 1873, No. 5, by Monsieur Zenkoff entitled "Local building notes" and by Monsieur Yanchevski on "brick making" in Nos. 28 and 42 of the same paper for 1872.—*Author.*

Provinces, the Zarafshán Circle and the Amu-Daria Section. It is cultivated in the gardens which encircle the towns and settlements, and it is distributed over an area which begins at the town of Turkistán and runs to the Russian border line towards the south and beyond to where that border line is parallel with the Khánates of Khiva and Bukhára.

From the very character of its cultivation and growth the wood of the poplar is sappy and soft. It is always found by the side of irrigation canals, or, if seen in groves, such will appear in those localities that are subject to heavy inundations. Consequently on being cut down the wood of the poplar rapidly contracts, and, in the course of the protracted period of heat in Turkistán, opens out into cracks which are sometimes from ¾ths to 1¾ths inches wide. Moreover, as this wood warps it takes a pronounced bend, and this is sometimes another reason for holding this tree to be unfit for building purposes. This circumstance causes special attention to be paid to the proper period for the cutting down of the poplar. The period chosen is the winter, for then the drying of the cut tree goes on gradually. The equalising of the drying process is furthered by leaving the root on the tree for some time after the poplar is thrown down and by drawing the trunk into the shade.

The great effect of the sun's ray's in Turkistán on the poplar may be illustrated by the remark that planks hewn from a green trunk and placed out in the open, in the course of 24 hours crack and open out to half their length and so warp as to be unfit for any building purpose. Even when the drying process of the felled poplar wood is carried on over some time, fissures appear in the angles of all the axe marks. Hence it is necessary to pay especial attention to the method of cutting or upheaving this kind of tree so as to preserve its wood from excessive paring down.

The Turkistán poplar, when once perfectly dry, possesses the character of again absorbing moisture and of swelling. Hence care has to be taken of such exposed wood-work as window or door frames that may be made of it. Frames that have been made in the summer of perfectly seasoned wood, during the winter and autumn so open out and swell as to break the glasses fitted into them. The window then cannot be closed except by planing away the swollen surface of the frame, and this process has to be repeated several times during the inclement season of the year. On the return of the warmer weather the frames once more contract and are useless, because the winter planing down has caused large chinks to appear between the several parts of the door or window and its frame. Varnishing or painting only lessens this evil to a certain degree. Monsieur Bogayevski has, however, obtained very great success in lessening this swelling and recontracting by saturating poplar planks several times with hot olive oil or with ordinary hot butter until the wood has retained a sufficient quantity.

A poplar is held to be at its prime between 20 and 40 years. After it reaches the latter age hollows appear in its trunk, and the core of the tree withers.

The natives therefore always cut down a poplar which has reached 40 years, as they justly fear that with strong winds such a tree will fall down of itself.

In spite of the inferior quality of its timber, the poplar of Turkistán will, by reason of the dryness of the climate, last for ten years, provided, that is, protection be afforded it from winter damp as above indicated, for whenever it is exposed to damp the wood of this tree rapidly deteriorates. This remark does not of course apply to such cases wherein the timber of the poplar is constantly immersed in water. In such instances it lasts for a long time.

The largest poplar beams have a circumference of from 2 to 3 feet at the lower end and are about 35 feet in length; but such beams are rare. Beams with a circumference of from 14 to 17½ inches and from 28 to 35 feet long are difficult to get. The average dimensions are—circumference 7 to 12½ inches, length from 14 to 21 feet.

Besides the garden-grown poplar there is the wild poplar of the mountain gorges which rises up by the side of streams or appears in groves and clumps.

This kind has a drier and more compact timber, and it is less subject to warping and deterioration than the garden-grown tree. But the wild poplar exercises no importance in the building line, as its hewing down in, and removal from, the mountain gorges are perfectly impracticable because of the difficulty of getting to it in such places.

Archa[1] (*Juniperus,* a dendroid).

This tree has received amongst the Russians in Turkistán the perfectly arbitrary name of *vereska* (which means juniper). It grows only on the mountains, and is the only mountain timber that is used as a building material. The wood of the *archa* is resinous and soft, and it is easily cut. Its rings are very apparent. In colour and scent it puts one in mind of the cyprus. This tree is brought from the mountains to the neighbouring villages. Indeed, the *archa* comprises nearly the sole building timber of Ura-Tapa, Zamin and Jizák (Fort Kluchevoye). It is transported also to Táshkand, Khojand, Sámarkand, Katta-Kurghán, and the towns of the Province of Fargána.

The merit of *archa* wood lies in the fact that it well withstands the action of damp, and so the natives make the low beams of their huts almost exclusively of it. The cost of *archa* wood is scarcely half that of willow, since it need not be bought in the gorges where it grows. A tree has only to be rooted out and carried away—labour which possesses a very low value amongst the natives. The insufficient supply of *archa* wood and its twisted nature as well as the fact that it can be broken more easily even than poplar constitute its defects. *Archa* trees are generally brought from the mountains in the form of cut beams of a thickness which is about double the width, but the latter varies very much at either end. Thus beams are frequently seen of the following proportions:—Length from 9 to 14 feet; measurements at the base from 3½ × 7 to 5¼ × 10½ inches; measurements at the top from 3½ × 4 to 5¼ × 7 inches. Beams of such slender proportions and rapid narrowing off towards the top render it expedient only to use this kind of wood when building has to be cheaply done or when no other wood can be got for the purpose. If it be possible to get *archa* beams of bigger and more regular proportions, such constitutes an exception to the rule.

---

[1] This is the local name.—*Author.*

Káragátch (*Ulmus Campestris Var*) or a kind of elm is raised in gardens, but in small quantities only. Its wood is both handsome and close grained. From its hardness and durability it is used by the natives for posts and for the well holes of large mosques. Of the same wood too wheel naves and spokes as well as axles are made, whilst the twigs of the same tree furnish material for fellies. On account of its high price the Russians use *Káragátch* timber only in rare instances wherein especial durability is required, such as the parts of machines. It is of some importance too for artillery purposes and for waggons. On account of its beauty the same wood is fashioned into carpenters' and furniture makers' productions.

Chinár (*Platanus Orientalis*) is occasionally met with in the gardens of large towns. It is sometimes used in native buildings and also for the posts of large mosques,—in fact wherever carved work is needed; for the wood of the *Chinár* is considerably softer than that of *Káragátch* or *mulberry*, whilst its grain is pretty. For furniture and joiners' work it is a very good wood.

Mulberry (*Morgus Nigra et Alba*) or the native *tút* is cultivated in all gardens, but principally in the Khojand district, the Province of Fargána, and in the Zarafshán circle. The principal reasons for the cultivation of the mulberry are the supply of its leaves as food for silk-worms and the durability, though dearness, of its wood, which is much used for building purposes. Of all local kinds of timber, that of the mulberry best withstands the effects of damp. It is therefore used in place of *archa* or willow in the more expensive structures. The beams and other wood-work of stone mosques are principally of mulberry and in rare instances of *káragátch*. In like manner mulberry timber is used for the posts and superstructure of bridges and for any erections by the side of tanks or ponds. On account of its durability and toughness (which nearly equal that of the oak), mulberry is used for all parts of machines. Its density and great specific gravity has led to the use of mulberry wood for pile driving.

Willow (*Salix*), the native *tál* or *iva*, grows everywhere in gardens and along irrigation canals. Like the willow, it is distributed in all directions from the town of Turkistán southwards, wherever, in fact, there are settlements and towns; but the wood is of no architectural importance. The natives use it for hydro-techincal works, such as piles, small bridges, rafts, boats (*caiques*), and water-ducts. But the chief reason for the cultivation of the willow is to get twigs wherewith to plait baskets, litters, &c. The same tree also furnishes brushwood which is used for fuel. On this account the mulberry trees are lopped yearly, all the young shoots being removed and the stem alone being left. This gives the tree the appearance of little height and great thickness, but this is not of importance, because the interior of the trunk is almost always hollow.

Wild olive (*Eleagnus hortensis*) or native *jida* is met with in all the gardens, and it grows wild too along the Sir-Daria. In Forts Julek, Perovski, No. 2, and Kázalinsk (Fort No. 1), this tree serves, by reason of the complete absence of all other timber, as laths in the construction of roofs and for small buildings generally.

The other kinds of trees met with in Turkistán consist of garden and fruit trees, such as the ash (*Shung-tál*), hazelnut, apricot, pear, &c., all of which are only fit for small articles of furniture and joining work generally.

Monsieur N. V. Bogayevski carried out some experiments at Táshkand in order to determine the breaking resistance of the wood of the poplar, juniper, elm, mulberry, willow, and ash. The results of such are as follows:—

	Puds.	Tons.
1. Poplar	180	3
2. Juniper	180	3
3. Elm	312	$5\frac{1}{5}$
4. Mulberry	395	$6\frac{7}{12}$ths.
5. Willow	$184\frac{3}{4}$	$3\frac{1}{12}$th.
6. Ash	$261\frac{1}{3}$	$4\frac{1}{30}$th.

On this basis Monsieur Bogayevski has calculated that the average coefficient of elasticity for each of the above kinds of wood is as follow:—

1. Poplar	30,000	*puds*	or 500 tons	to sq. inch.
2. Juniper	19,000	„	or $316\frac{2}{3}$rds	„ „ „
3. Elm	35,000	„	or $583\frac{1}{3}$rd	„ „ „
4. Mulberry	37,500	„	or 615	„ „ „
5. Willow	26,500	„	or $441\frac{2}{3}$rds	„ „ „
6. Ash	37,500	„	or 615	„ „ „

With regard to the elm, which grows abundantly in the mountains of the Semiraitchensh Province and the Kuljan region, Monsieur Bogayevski thinks the building properties of its wood are very similar to those of the poplar.

Having examined the forest growths of Turkistán, let us now turn to the other materials which are in use for building purposes in the same country.

Reeds.—These grow about lakes, the back-water and branches of rivers and in marshy places generally. Besides serving as fuel, reeds have an importance in that they are an indispensable material in the construction of the mud roofs which for the most part obtain throughout Turkistán. In such cases a thick layer of reeds is placed over the lath and plaster work, and over these again is thrown the earth. From reeds too are woven wattles which are likewise used in the construction of roofs. These are placed directly over the lath work to preserve the interior of the dwelling from the dust, &c., of the reeds above and also to give the ceiling a more tidy appearance.[1]

From investigations carried out recently by Monsieur Teikh (head of the chemical laboratory at Táshkand), reed ashes may be added to the number of building materials, since they enter into the composition of hydraulic cement. This cement comprises two parts of lime, one part of brick dust, and five parts of reed ashes.

Straw.—This is of the same importance as reeds for ordinary building purposes. After the grain has been trodden out by the cattle, the straw, which is much tossed about, remains on the floor, and when it is in this state, *i.e.*, cleared of the grain, the natives give to it the name of *saman*. This material is used for mixing with mud plaster and for stucco prepared in the native way. When mixed with clay it is likewise employed in the manufacture of the so-called *saman* bricks which some hold to be more durable than ordinary sun-burnt bricks.

---

[1] A ceiling forms part of the construction of such buildings as are in vogue in Turkistán.—*Author.*

Clay, the native *lai*.—This constitutes the chief building material in the country since it is found everywhere, and is very cheap, and because too of the insufficiency of other building material such as wood, stones, and baked bricks. The greater portion of the buildings of Turkistán are constructed of this raw material, the more so because the climatic conditions of the country admit of such a material lasting a very long time, provided that the foundation and plinth afford proper protection to the walls against the damp of the soil generated by snow and rain. Sometimes the ordinary clay bricks are replaced by those that are made up with a mixture of the *saman* described above.[1]

The preference given to *saman*-mixed over ordinary mud bricks arises from the idea that they are more durable and better able to withstand disintegration from rain because the *saman*, or chopped straw, partakes of the nature of a binding element. But in reality this idea can scarcely be held to be thoroughly well founded, since practice has shown that clay mixed in the above way with *saman* and worked up in the form of bricks is of a very poor consistency and cannot be said to be very plastic. Hence such bricks have no regularity of surface, whilst when they shrink they become crooked and lose their proportions accordingly. Moreover, bricks of this composition are not of a uniform body, and, their clay elements being separated by particles of straw, they more readily yield to the shock of a fall or blow than do ordinary mud bricks of good manufacture.

Practice has, indeed, proved that in the case of *saman*-mixed bricks the *saman* particles should be added in the smallest quantity, and in such a way that the moulding of the brick be evenly carried out. If this is done the *saman* will scarcely be traced amidst the mass of clay, and yet the counteracting of the disintegrating process will be insured. Lastly, if we subject to the same conditions both kinds of brick, it will be found that the *saman*-mixed sort will scarcely last the longer, because after all, its chief element being clay, it will also quickly yield to the direct action of water.

To this fact we may add that the manufacture of ordinary sun-dried bricks presents no sort of difficulty, because everywhere throughout Turkistán pits may be dug and clay secured which is not only free from any particle of sands, but which is of such a tenacious quality that there is no fear of the bricks made from it cracking.

To the faults of the *saman* bricks may be added yet another, *viz.*, the greater chance of the introduction of rats through their adoption, than when ordinary sun-dried bricks are used, since the latter contain no stores of food for these rodents.

If walls raised of ordinary sun-dried bricks are so protected that the rain and snow, as it drops from the roof, cannot percolate to them, and if their foundations and plinths are preserved from the damp of the soil around by being constructed either of stone or kiln-burnt brick, they may last for decades. Hence there is after all scarcely any difference between the lasting power of ordinary clay and of *saman*-mixed bricks.

---

[1] Generally speaking, a thousand bricks of large size, *i.e.*, of the following proportions, 14" × 7" × 3½", require from 5 to 10 sackfulls of *saman*, according to the size of the sacks used.—*Author.*

The properties of the local clay and the favourable conditions of the climate enable the natives to use the former as a building material and in a more durable form than that of an ordinary brick. Thus they raise enclosure walls and sometimes those of their dwelling-houses by simply building up lumps of clay in layers which extend throughout the entire length and breadth of the wall in process of construction[1], the depth of such layers ranging from 1¾ths to 3 feet. In such work, which reminds one of the earth and clay beaten or plastered walls of Russia, the natives do not use moulds or rammers, but simply scoop up the moist clay with shovels and beat it down slightly until each layer has reached a height of from 21 inches to about 3 feet. The edges are then trimmed a little and dressed by means of a cord stretched over the surface. Over the partially dried layer another is placed and so on in succession. In the same manner the natives erect the walls for defensive purposes at all fortified points. The latter are raised to a height of from 28 to 35 feet, with a thickness at the base of about 21 feet, which is narrowed upwards until it is reduced to from 4½ to 2 feet.

Every one who has served in Turkistán has seen enclosures, walls, and domes with their vaults and cupolas. All these are of clay which last for decades, although completely exposed to bad weather. They do not fall to pieces, though, of course, some are not a little cracked. In this respect the tombs (*mullushkas*), rising out of the grave-yards on the steppe, with their clay-made cupolas from 12 to 16 feet in diameter, are especially interesting.

Clay is used too as plaster for the cementing of walls that are made of mud or *saman*-mixed or even of baked bricks. In the latter instance *saman* is sometimes added to the plaster.

Clay in the form of stucco is also in very general use. For this purpose *saman* is added in such quantities that the mass receives the consistency of paste, half being clay and half *saman*. The mixture is left to stand for about 24 hours, and the plaster is got ready the night before it is wanted for use. During the period of stagnation the plaster assumes a peculiar yellow shade and acquires a peculiar odour, which no doubt arises from the setting in of fermentation of the organic particles. Such are indications that the plaster is ready for use. It is first of all laid on in the rough, and a second coating given; the surface is then rubbed over carefully with iron trowels. In such cases as call for extra care, a third layer is added. This is prepared of finely sifted clay dust and sifted or finely cut *saman*. The surface is now rubbed with trowels and becomes so smooth as to glisten and to present a bad surface for whitewash.

Bricks, or, as the natives called them, pshken-khisht.—Until the Russians came into the country bricks were not in frequent use. Indeed, baths and some especially well-endowed mosques only were made of them. In Táshkand and Sámarkand brick kilns still remained standing; but these only pointed to work which had at one period been in progress, but which had come to an end. In other towns when the necessity arises for brick-making on a large scale, kilns have been expressly constructed and workmen sent for from the principal towns. But with the discontinuance of building operations brick-making has also ceased. From this it is apparent how little this particular industry is developed in the country.

---

[1] This work is locally known by the name of *pakhta*, or beaten clay.—*Author.*

The ordinary Asiatic brick is a square block, the sides of which measure from 8 to 9 inches, with a thickness of from 1 to 1¾ inches. One uniform measurement does not, however, obtain, so that the size varies from the above figures according to the will of the makers. The best bricks are of a whitish shade according to the quality of the clay. Bricks of a reddish colour are imperfectly burnt and correspond with the rose-coloured bricks of other places. Firebricks are of a white hue mixed with the greenish vitreous particles of coal which enter into the composition of the brick.

Red brick can only be used in such cases as admit of the presence of that colour. In the open air and when subject to atmospheric changes bricks of this colour easily disintegrate, and if they are subjected to the action of water they become sodden.

At present in Táshkand, Sámarkand, and other towns kilns are being constructed in which are turned out bricks of the ordinary Russian shape and of the following sizes: 10½″ × 4¼″ × 2¼″, and the natives are also beginning to make these in their kilns. The burning process is carried on by means of reeds, brushwood (*kolutcka* and *jantak*), &c. Wood, on account of its extreme scarcity, is not used for the purpose.

Although native-made bricks are well burnt they are inferior, in that the clay composing them is not mixed with sufficient care. To this defect must be added the fact that very often they are made of a salt-impregnated clay, the result being that the bricks receive, after use, a crust of salt. Sometimes too the clay is badly cleared of minute pebbles (*golisha*) or of particles of lime. The presence of these causes the bricks to crack and crumble. All these circumstances have to be kept in view when bricks are taken in or bought.

When mud built tenements are erected for the Russian troops in Turkistán, the rule is made that the foundation and plinth must be of either stone or kiln-burnt brick. The same rule too is observed in the case of brick kilns. But now, however, entire buildings are beginning to be built of brick. All this is resulting in the development of the brick-making industry and in causing the bricks which are prepared to be of a more suitable description. At Táshkand the prices per thousand of the several sorts are: for well burnt white, 16 *roubles* (£2); ½ white, 14 *roubles* (£1-15-0); red, from 10 to 12 *roubles* (£1-5-0 to £1-10-0). Mud bricks per thousand cost 1½ *roubles* (4*s*.) on the spot. The very best burnt bricks can be bought for 17 *roubles* (£2-2-6) per thousand.

Native-made bricks are used for flooring purposes, firing-pans, &c., but for wall building their use is avoided on account of their bad binding qualities.

Of pottery-ware pipes measuring 28 inches in length with a diameter of from 3½ to 8 inches have some importance since they are used for draining the water off the roofs and for irrigation purposes.

Monsieur Bogayevski's experiments with regard to the determination of the breaking resistance of native-made mud brick, beaten clay, and kiln-burnt brick respectively gave the following results :—

The first yielded to a pressure of from 12 to 14 *puds* (412 to 504 lbs) per square inch and began to break up under a pressure of 11 *puds* (396 lbs) to the square inch; consequently the latter figures must be taken as the safe limit of the breaking resistance of mud bricks.

Beaten clay yielded to a pressure of 8 *puds* (288 lbs) and began to break up under a pressure of 6 *puds* (216 lbs).

Kiln-burnt brick began to break up under a pressure of 30 *puds* (1,080 lbs) to the square inch.

Gypsum or alabastar (*the native gántch or bor*) is found almost everywhere in the Tián-Shán range. Near Sámarkand it is dug out, in the form of pure selenite, close to the Chupan-Ata heights. The uses to which alabaster and gypsum are put are identical, but the latter (*bor*) is more highly prized, because it hardens more rapidly and is infinitely whiter than gypsum or *gántch*. Both are used in stuccoing the interior of buildings and by the natives for the moulded decorations of their walls, doors, and windows, &c. They design arches over them and fill up the interval with stone facing. The material thus used is not pure gypsum, but a mixture consisting of gypsum and clay. This the natives call *gátchkhak*. It is used for economical reasons, but such a combination readily becomes detached and then the mouldings have to be washed over with a solution of pure gypsum, or sometimes the whole exterior design is faced with brick imbedded in gypsum.

Walls that are to be ornamented with gypsum are first of all plastered over with clay and *saman*, in the way described above, but in place of the last coating of sifted clay and chopped *saman*, *gátchkhak* is used.

Over the *gátchkhak* is laid a stucco of pure gypsum, and this is sprinkled with water and smoothed over with iron trowels. Sometimes two walls are decorated with *gátchkhak* only, and then they take a greyish hue.

No washings of pure gypsum, and especially of *gátchkhak* used in stucco work, satisfactorily withstand atmospheric changes. This is especially the case in places exposed to damp; the layer then swells and gets discoloured, and finally turns into a powdered mass.

Besides alabaster (*bor*) and pure gypsum (*gántch*) an adulterated gypsum, which also bears the native name *gántch*, is met with in certain localities. For example, about Táshkand on a level spot near the Zangáta settlement beds of this material are found at a depth of less than 7 feet below the surface. It here takes the form of a spongy confused mass of a greyish-white colour. This after being heated becomes almost white. An analysis conducted by Monsieur Bogayevski has shown that 4 grains of unburnt adulterated *gántch* taken from Zangáta contains :—

	Grains.	Parts.
Gypsum (aqueous sulphuric acid lime) . . .	2·45	61·25
Carbonate of lime and oxide of iron . . .	0·90	22·50
Flint and clay particles undissolved by acids . .	0·65	26·25
	4·00	100·00

Gypsum in a pure state when used as a wash fulfils the purpose very well, thanks to the climatic conditions of Turkistán; for in this country there are buildings two or three centuries old whereon the gypsum coating is in a good state of preservation. Wherever some discolouration has been going on, such is confined to the exposed parts of the design. On the other hand, a coating of *gátchkhak, i.e.*, of mixed gypsum and clay, is found to be everywhere a disintegrated mass which can be dug out with a stick without the exercise of any force.

Lime (the native *Akhak*) is dug, for the use of the Sir-Daria line of forts, *i.e.*, for Kázalinsk, Fort No. 2, Perovski and Julek, out of Nicholas Island in the Aral sea whence it is transported by vessels of the Aral flotilla. In other localities lime is worked at two points. Here it is obtained either by quarrying limestone in the mountains or by collecting limestone pebbles along the banks of the several mountain streams. At Táshkand and Sámarkand the lime thus obtained is always very rich, whereas that which is procured by quarrying stone in the mountains varies very much in quality.

The natives do not use lime in the form of cement; for this purpose either gypsum or a mixture of gypsum and clay (*gátchkhak*) is employed. Indeed lime is only worked in very small quantities by potters who use it as a glaze.

It was only when the Russians came to the country that lime was burnt in large quantities, and the places where it is to be found sought out. Even now the various kinds of limestone have not been finally ascertained, nor is the quality of each sort definitely understood, as for instance whether any is of the nature of hydraulic limestone. Although experiments at making artificial cement have been carried on at Táshkand, the manufacture of such has not commenced on account, probably, of the uncertainty of selling it.

Of all the carbonaceous particles of lime met with in Turkistán, the insufficiency of chalk is very apparent. This substance is not procured, indeed, in the country, but is brought from Orsk, and is extremely dear. Just as the bad quality of the forest trees, which we have before described, is sufficiently evident in the appearance of the window and door frames in use in the country, the want of chalk putty has a very perceptible influence on the large number of broken panes, and this circumstance largely affects both repairs and the numbers of panes imported from Russia. The general substitute in Turkistán for putty is gypsum, but this of course falls out in the course of every winter. In some places gypsum is replaced by lime, but this surmounts the difficulty only in a measure. Ochre and umber alone seem to be the only tolerable substitutes for putty.

These materials, however, are only found in small quantities about Khojand, and are so uncertainly produced as to preclude their generally coming into use.

Through the discoveries of mining engineers, chalky formations have been found in many parts of the country, *viz.*, in the neighbourhood of Khojand, the mountains to the east of the Mogol-Tau, the highlands of the Zarafshán and about the Taushin settlement. But the discovery of pure chalk has not yet taken place, and the probability of such a discovery under existing conditions seems to be very small.

Sand or *Kum.*—This is found amidst the steppe and on those vast tracts of country which constitute the infertile and almost untraversable regions. Those portions of Turkistán which are mainly taken up with settlements may be said to be almost devoid of sand. Indeed in such places good, pure, quartz sand is scarcely to be seen. In the neighbourhood of such towns as are selected for the quartering of Russian troops and where building is principally carried on, the sand which has hitherto been found has been mixed either with clay or lime or perhaps with both, but the presence of quartz therein has been most infinitesimal. The want of good sand of course directly influences the quality of the plasters used, and this has been much felt of late. In 1873 quartz sand was at last found in the neighbourhood of Khojand, and with the aid of this ovens of the standard pattern were constructed for the manufacture of glass, the factory being equipped by the merchant Isayeff. In 1875, however, the works were overthrown by the Khokand rebel bands.

Asphalt (*kára-mom*) is prepared on the borders of the Province of Fargána and is also imported from Bukhára. The latter is the purer, but its use is very limited.

Attempts were made to construct asphalt roofs, but these were not attended with success. It may be hoped, however, that with more careful working and with the study of the properties of asphalt its use may become more general and in time that this material may to some extent supply the want that is now so manifest of hydraulic cements, and even of resin which European Russia alone supplies.

In conclusion, it may be said that the mountains of Turkistán present, as we have said above, a rich store-house of building material and of metals, but by reason of the scarcely opened life of this vast land its wealth has as yet scarcely been touched.

SECTION VI.

THE TURKISTÁN ARMY.

Introduction.

Scarcely had the thunder of our triumphs in the Caucasus and in Trans-Caucasia become silent when Providence thought it proper to point out to our Fatherland another arena for as famous and brilliant exploits. With the year 1864 set in a series of Russian successes in Central Asia, wherein the Russian arms acquired new glory and received fresh wreaths of victory. The Russian standards now wave on the walls of Sámarkand, the capital of the terrible Timur, and the Russian name is heard in the Tián-Shán range and along the Amu-Daria. For such brilliant successes the Russian Fatherland is indebted to the Turkistán soldier for his honest and self-denying fulfilment of the pre-arranged plans of his superiors.

Notwithstanding the comparatively short period of the enforced activity of the Turkistán army, such activity has succeeded in producing results which may be described as very remarkable. They are as follows:—

1. Under the escort and protection of the bayonets of the Turkistán troops, emigrants from European Russia and Western Siberia began to move into Central Asia and to colonise in Semiraitchia, *i.e.*, on the eastern borders of the Turkistán Military Circle. In the Sir-Daria province, Russian settlements exist only at two points, *viz.*, the towns of Kázalinsk and Perovski, but there is no doubt that in a short time Russian colonisation will receive a great development in this province.

2. Thanks to the safety insured by the presence of the Turkistán troops, Russia's Central Asian trade is increasing from year to year. The caravan roads connecting the Central Asian Khánates with Russia have been made much more fit for the passage of trade caravans. The withdrawal in 1868 of the Orenburgh-Siberian customs' line does not admit of the possibility of ascertaining the latest amounts realised by the trade between Russia and Central Asia; but we have trustworthy data for forming an estimate as to the trade of Táshkand, the chief trading centre of Turkistán. These data show that in 1871 the general trade of Táshkand with both European and Asiatic Russia and with the independent Khánates equalled in value 15,039,631 *roubles* (£1,503,963), and that in 1872 it amounted to 17,977,917 *roubles* (£1,797,791). Consequently that in the course of one year it had increased in value by almost 3,000,000 *roubles* (£300,000). Prior to the advent of the Russians the trade returns of Táshkand scarcely reached the figures which represent 5,000,000 *roubles* (£500,000).

With the regular construction in 1874 of the Orsk-Táshkand postal road, the majority of the Khivan, Bukháran, and Khokandian merchants began to drive in Russian carriages along this road from Nijni to their own homes and back again, instead of by their former method of progress on camels. Lastly, by the occupation of Krásnovodsk and the lower portion of the Amu, the shortest way of communication between Russia and Central Asia, that indicated by Peter the Great, is being opened. This road has not yet been made because, indeed, as a trade route it was only opened after the Khivan campaign of 1873, so that all the reasons that interfered with its complete safety have not yet been removed.

3. The last decade of science has made many conquests in Central Asia. The thick darkness which up till then had covered Central Asia, of which we, indeed, knew less than of the surface of the moon, has begun to clear away. Humboldt had said that he would indeed be a fortunate man who could place a fragment of the Tián-Shán rocks in a European museum. But within two decades after the death of this famous *savant* nearly the whole of the Tián-Shán range has passed into the Russian dominions. A whole band of unwearied travellers and explorers has penetrated into prohibited countries, and has with unusual interest and energy begun to study them in every particular. Many works relating to their geography, statistics, geology, botany, language, archæology, &c., &c., have appeared in print, and many others may be looked for in the future.

In Central Asia scientific explorations are possible only under one condition, *viz.*, that the particular country in which they are carried out be under Russian rule. When this is not the case the explorations are hampered by the native rulers who see in every European *savant* a spy and an evil-wisher who must of necessity be kept away. The melancholy fate which in 1841 overtook Stoddart and Conolly in Bukhára and Hayward at Yassin in 1870 shows how dangerous it is to explore the independent countries of Central Asia.

Whilst we have very minutely explored the territories in our own possession, we remain almost in our former ignorance of those beyond, *i.e.*, of Káfiristán and of the countries between the upper course of the Amu and India.

From what has been said it is apparent how much science in Central Asia is indebted to the Turkistán troops, under whose protection alone she is able to do anything at all.

4. The introduction of Russian rule into Central Asia has revealed the great service that has been rendered to the development of the ideas of humanity in general. Self-will, anarchy and despotism which once ruled there no longer exist in those countries of which we are now possessors. Slavery too has disappeared never to return. The famous slave market of Khiva at which Persians and other peoples were sold like ordinary cattle ceased to exist after the last glorious Khivan campaign. In Bukhára too by the treaty concluded by General Kaufmann after the Khivan campaign of 1873 the trade in slaves was prohibited for all time.

It may then fearlessly be said that Russia's Central Asian wars have always resulted in the triumph of truth and justice, since through them civilisation has been and is engaged in a strife with barbarism and arrant ignorance.

5. Thanks too to Russia's successful wars in Central Asia, her might has grown not only there but also in Europe. These wars and campaigns were at first expensive, but subsequently were covered in part by

contributions levied on the conquered lands. Thus were attained the objects forecast by the Russian Government. How important for us our triumphs and conquests in Central Asia have been may be concluded from the fact that every conquering sound of Russian Armies in Turkistán has painfully re-echoed in the hearts of Russia's ill-wishers, people who regard with envy our political and military development. We will not pause here to dilate on this side of the services rendered by the Turkistán soldiers, as this question would draw us far away from our subject. But what we have already said will suffice to convince any one of the important results attained by our Fatherland, thanks to the labours and exertions of Russia's Turkistán forces.

CHAPTER I.

TURKISTÁN TROOPS.[1]

(Dislocation of the troops of the Turkistán Military Circle.)

Distribution of the troops in the Circle—Average strength and composition—Outer line of forts—Securing of the Russian Frontier : (1) with Khiva : (2) with Bukhára : (3) with China—Kuljan region—Inner line of forts—Uniform plan of the fortified posts of Turkistán—Character of the barrack accommodation in Turkistán.

The distribution of the Russian troops over the Turkistán Military Circle is mainly dependent upon its extent and political circumstances. The area of the Circle is estimated at 952,609 square *versts*, or 19,441 square miles, *i.e.*, equal to about $\frac{1}{20}$th part of the superficial area of the entire Russian Empire. On its southern and eastern frontiers, the Turkistán Military Circle is conterminous with the three independent sovereignties—Khiva,[2] Bukhára, and China.

Such a vast extent of territory, and the circumstance of its bordering upon these independent States, naturally call for the breaking up and dissemination of the Russian forces over an area which is more than twice as large as France and thirty-five times the size of Belgium.

The Turkistán Military Circle is held by 25 battalions (18 line, 4 rifle, and 3 local[3]), 8 Cossack regiments (3 Orenburgh, 2 made up of Orenburgh and Ural Cossack *sotnias*, 2 Siberian and 1 Semiraitchensk), 88 field and mountain guns. The entire strength of the Russian forces in the Turkistán Military Circle consists of 1,402 officers and 46,465 rank and file.[4]

If we assume the entire population of the country to be 3,038,119 souls, then there is 1 soldier to every 65 souls. As already stated, the Turkistán troops are distributed over the Circle in small parties, and form the garrisons of forts and redoubts, which are hundreds of *versts* distant the one from the other ; in the majority of cases too, they are isolated by desert and unpopulated tracts.

---

[1] NOTE.—With reference to the 5th para. of the Introduction to the 3rd Volume of the English Edition of this work the portions of the Russian volume translated and abridged by Major Clarke will be found on pages 215, 216, 218—220, 222, 226—229, 232—236, 237—239, 261—302, of the Russian Text.—W. E. G.

[2] Khiva would be more correctly described as a " protected " or vassal state. In a somewhat lesser degree the same remark applies, too, to Bukhára.—*Trans.*

[3] Besides a sapper half battalion.—*Author.*

[4] These figures refer to returns of the $\frac{1}{13}$th January 1879.—*Author.*

In the arrangement of the forts and redoubts, the following peculiarity is observable : the fortified points of Russian Turkistán form two lines, an *outer* or *advanced* and an *inner* or *reserve*. In the advanced line, there are two or three fortified points on the frontier with each independent sovereignty. Thus, on the frontier with Khiva, there are Forts Peter-Alexander and Nukus : on the frontier with Bukhára, there are Sámarkand and Kátta-Kurgán : in the stretch of country bordering on Káshgar, there are Forts Kárakol and Nárin : on the frontier with China, there are Forts Bakhti and Borohudzir.

Besides the foregoing, a portion of the Russian troops are still stationed in the Kuljan region, which, with its salient form, projects like a ravelin.

Let us examine, in greater detail, the arrangement of Russia's frontier points.

1. *Frontier with Khiva.*—The Russian frontier with Khiva throughout its extent, from the Táldik mouth of the Amu-Daria to Itcke-Yár, is covered by that wide and copious river, the Amu-Daria. The natural defensibility of this border line, and the almost entire absence of a military force in the Khivan Khánate, enable the Russians to keep in their Amu-Daria province to watch Khiva, but a very inconsiderable number of troops, *viz.*, two battalions, one mountain battery, one Cossack regiment (4 *sotnias*). These forces are stationed at Fort Peter-Alexander, which was built immediately after the Khivan campaign of 1873, and at Fort Nukus, the construction of which was finished in the autumn of 1874.

Fort Peter-Alexander stands 2½ *versts* (1⅔rds miles) from the right bank of the Amu-Daria, 9 *versts* (6 miles) from the passage of that river at Khanki (Hanki), and 4 *versts* (2⅔rds miles) from the town of Shurakhán. From Khiva to Fort Peter-Alexander the distance is 53 *versts* (35⅓rd miles). The object of building Fort Peter-Alexander close to the Khanki (Hanki) passage of the Amu, was to look more closely after the capital of the Khivan Khánate, for within three or four days the Russian troops could march thence to the walls of Khiva.[1]

Fort Peter-Alexander constitutes, moreover, the administrative head-quarters of the Amu-Daria section. Its works are quadrangular in appearance, with flanking tower-bastions at the corners. In their construction the walls of the garden belonging to the Diwán-Begi, Mat-Niáz, a Khivan dignitary, were utilised. Inside barracks and mud huts have been erected for the troops, and wells dug for the water-supply of the garrison. The fort is sufficiently far from the river bank to be out of the reach of the spring floods during which the water of the Amu-Daria inundates the entire neighbourhood.

In order to establish a firmer footing in the Amu-Daria section, and to better observe the whole border line with Khiva, the Russian Commandant of the section recommended, in 1873, that another fortified point lower down the Amu might be established. The point chosen for this new fort was at Nukus, and close to the point where at present the only navigable branch of the Amu, the Kuván-Jarma, leaves the main channel. The Emperor was afterwards pleased to sanction the erection of a fort on this spot. The works in connection with this new fort were begun towards the end of September 1874, and the fort received the name of the Nukus Fort. The outline of the works is quadrangular, and there are two flanking tower-bastions at opposite angles. The garrison consists of one company of infantry, one *sotnia* of cavalry, and two guns. The profile given to the work is a very sharp one; hence but a few men need be left inside for its protection, the rest being sent out to assume the offensive in the open field.

---

[1] The most serious part of this march would be the passage of the Amu.—*Author.*

If Fort Peter-Alexander serves us with the means of checking the manifestation of any hostile efforts that may be set in motion in Khiva itself, it may be said that Fort Nukus overawes the Turkumáns. Here, too, is a practicable ferry across the Amu, so that our forces, after appearing on the left bank of that river could immediately operate in the very midst of that rebel and restless people with whom the Khán of Khiva is powerless to fight. In the neighbourhood, too, of Fort Nukus is grouped a considerable portion of the population of the Amu-Daria delta. Hence the erection of a fort at this point has justified the objects of the administration. The economical conditions, too, of this locality are good, for fuel is to be had around, and on the islands in the several bends of the Amu-Daria there is excellent forage for horses.

Notwithstanding the small number of Russian troops in the Amu-Daria section, the strength is sufficient, not only for defence, but for offensive purposes. Thus in the year 1874, when the Turkumáns on the left bank of the Amu displayed intentions which were hostile to ourselves, Colonel Ivánoff, Commandant of the Amu-Daria section, with several companies and two guns crossed over to the left bank of the river at Kipchak, and after crushing the robbers returned hom

Communication between Fort Peter-Alexander and Táshkand is maintained over the Kizil-Kum steppe *viá* Kázalinsk (Fort No. 1), the distance to which from Fort Peter Alexander is reckoned to be 595 *versts* (396⅔rds miles). Between these two points the postal service is performed by mounted *jigits*, who, with two horses in each relay, accomplish the distance in five or six days. From Nukus to Kázalinsk the distance is 561 *versts* (374 miles). That from Fort Peter-Alexander to Nukus, along the right bank of the Amu, 175 *versts* (116⅔rds miles).

A proposition is under consideration to connect Táshkand with the Amu-Daria section by a post road; there is great urgency for this, and all private persons and parties of troops moving to and fro unite in saying so.

2. *Frontier with Bukhára.*—The Russian frontier line with the Khánate of Bukhára is much longer than is that with Khiva; but at the same time the greater portion of it is well protected on the west by the nearly waterless sands of the Kizil-Kum or by the lofty and difficult Hissár mountains to the east. On both slopes of this range the settled population is poor and sparse. Thus along the Zarafshán river and its tributary streams dwell mountaineers, part of whom are Tájiks and part Yagnauts. These races, which have now been incorporated in the Russian Empire, on account of their poverty can only offer a passive resistance. On that

---

[1] In 1875 a portion of the Amu-Daria forces, numbering 1,500 men, accomplished a two weeks' march through the Khivan Khánate, and amongst the nomad Turkumán tribes, with the object of breaking up a combination amongst the latter and compelling them to yield to the Khán's demands. Although this movement was accomplished without fighting, it attained the object in view and produced an excellent impression amongst the inhabitants of the Khánate. Similar movements have been occasionally made since.—*Author.*

side of the Hissár range wherein lie Hissár and Kuláb, the south-east provinces of Bukhára, there is a sparse population which is ready at any moment to throw off its allegiance to the Amir. Consequently from that side the inroad of an enemy's forces into Russian territory can scarcely be looked for. There, too, the Russian frontier is as well shut in by mountains as the western portion is secured by desert wastes. It is only in the centre of the Russian frontier line with Bukhára that there appear as it were gates presenting a very convenient communication between the Turkistán Military Circle and the very heart of the Amir's possessions, the capital of Bukhára. Here issues the postal route between Táshkand and Sámarkand, and so on to Kátta-Kurgán, whence to Bukhára the distance is only 330 *versts* (110 miles), *i.e.*, 6 or 7 marches along a good road, which is thickly populated on either side.

As the military forces of the Amir of Bukhára are considerably stronger and better trained than are those of the Khivan Khán, the Russians have to maintain on this side a larger body of troops. Thus at Kátta-Kurgán, 20 *versts* (13⅓rd miles) from the frontier, one battalion of infantry is stationed. At Sámarkand, 66 *versts* (44 miles) eastwards, there are 3 battalions of infantry, 6 *sotnias* of cavalry, and 1½ batteries of artillery.

These forces suffice not merely for passive defence, but for active operations as well. This has been shown to be the case several times, *viz.*, in 1868, when General Abramoff moved from Sámarkand with several companies, *sotnias* and guns, towards Kárshi. On this occasion, after destroying the rabble of Kátta-Tura, the Amir's rebel son, who had endeavoured to wrest the throne from his father, General Abramoff safely returned to Russian territory. Again, in 1870, General Abramoff, by order of the Commander-in-Chief in Turkistán, moved out from Sámarkand with a portion of the forces entrusted to him to punish Jura Beg and Bába Beg, the Begs of Shahr-i-Sabz, who would not acknowledge the Amir's rule and who had made inroads upon Russian border subjects. Having crossed the Shahr-i-Sabz mountains he reduced in a few days the well fortified towns of Shaar and Kitáb, both of which have since been in possession of the Amir of Bukhára.

There is no doubt that the four battalions of infantry, the 6 *sotnias* of cavalry, and the battery and a half of artillery, which are stationed in the towns of Sámarkand and Kátta-Kurgán, would be more than sufficient to crush the head of Muhammadanism in Central Asia, *viz.*, the Amir of Bukhára, should he take into his head to alter his present friendly relations towards Russia,—a proceeding which can hardly be looked for on his part.

3. The Fargkána province forms the central portion of the Turkistán Military Circle, and the heart of it lies in the valley of the Upper Sir, which is known by the name of the Farghána valley. This portion of the Turkistán Military Circle is still less open to hostile inroads, for, in the first place, it is defended by the high and difficult Alai range; then by another, higher and still more inaccessible range, that of the Trans-Alai; lastly by the wide zone of barren and desert Pámirs.

The troops quartered in the Farghána province are there principally to secure the loyalty of a populous and recently-annexed tract. The garrison consists of 7 line battalions, 2 Cossack regiments (12 *sotnias*), 3 batteries of artillery, and a rocket ½ battery. This force is very compactly concentrated in the centre of the province: thus there are at

Margilán, 3 battalions, 2 batteries, and 3½ *sotnias*; at Khokand, 1 battalion, 1½ *sotnias*, and the rocket ½ battery; at Osh (Ush) and Námangán, each 4 companies and 1 *sotnia*; at Andiján, 4 companies, 1 *sotnia*, and 1 battery. In each of these small detachments 1 company or 1 *sotnia* is distributed on the borders of the Farghána *oasis*, *viz.*, at Wádil, Gulcha, Uzganj, and Chust.

4. *Frontier with Chinese Turkistán (Káshgária).*—When the Turkistán Military Circle was formed in the year 1867, the Russian frontier with Káshgária, on the basis of the 2nd Article of the Chuguchak treaty, was held to be the southern branches of the Celestial Mountains (the Tián Shán) from the Khán-Tengri group to the limits of Khokand. In spite, however, of such a visible line of frontier, the then ruler of Eastern Turkistán, Yákub Beg, had no wish to acknowledge it. He, on the contrary, asserted his pretensions to land lying on the left bank of the river Nárin; and, in order to keep up his supposed right of sovereignty therein, he interfered in the affairs of the Cis-Nárin Kirghiz, who were Russian subjects. In view to circumventing Yákub Beg's intrigues and to keeping the Russian Kirghiz from the influence of the ruler of Káshgária in the year 1868, a detachment of Russian troops was sent to the Nárin river. The duty of this force was to guard the frontier line; and to do this it was obliged to throw a bridge over the Nárin river, in close proximity to the point where a Chinese bridge already existed. Whilst it was occupied with the construction of this bridge, the detachment threw up a small fort on the left bank of the river, and this fort was provided with barrack accommodation. The building of this fort and bridge still more incensed Yákub Beg, who, by the exercise of a futile spite, endeavoured to take his revenge by harassing Russian trade with Káshgária. Russian caravans were thus kept at Káshgár for a whole year: Russian merchants were arrested and their wares appropriated, payment being given on the very lowest scale,—action which entailed very great loss on the owners.

Yákub Beg reckoned apparently on the inaccessibility of his country, and was well aware of all the difficulty that would attend a Russian force invading Káshgária.

In order to compel Yákub Beg to yield, the Governor General of Turkistán in 1868 busied himself with the construction of a road from the southern portion of Semiraitchia to Yákub Beg's possessions. Work was first of all carried on at the Buám gorge, and in the year 1872 at the Juván-Arik defile. The troops furnished the working parties, which were superintended by the sappers under the officers of the Turkistán Sapper Company. These works will always remain as a memorial of the skill and indefatigable energy of Russian troops. By their hands the hitherto inaccessible Tián-Shán range was, so to speak, pierced nearly right through, and there now exists a good carriage road right up to Fort Nárin.

From Fort Nárin to Káshgár, a road leads over the Turugárt pass (on the last of the southern Tián-Shán spurs). This road could also be very easily worked up for wheeled traffic.

Seeing the stubborn pertinacity of the Russians in the pursuit of their lawful demands, the Káshgárian ruler became amenable to reason in 1872, and assented to the signing of a trade treaty by which free trade with Káshgária was secured to Russian merchants.

The Russian frontier with Káshgária is protected by Forts Nárin and Kárakol. The garrison of the first consists of a local levy and 1 *sotnia* of cavalry. In Fort Kárakol and its neighbourhood are stationed 1 battalion of infantry, 1½ *sotnias* of cavalry, and a mountain battery.

The duty of these detachments is—(1) to secure the Russian frontier from hostile operations from the side of Káshgár; (2) to look after the nomad population in the Cis-Issik-Kul tract; (3) to protect the Russian colonists. Under the protection of the garrison of the town of Kárakol, Russian settlers have taken up land about the eastern shore of lake Issik-Kul. In the neighbourhood of Fort Nárin, too, Russian settlers are arriving. Both the above forts are connected with Táshkand and Vairnoye by post roads.

Whilst on the subject of the securing of our frontier line with Káshgária, mention must be made of the Muzárt post, in the valley of the Tekes, where that river is joined by the Urten-Muzárt, and 5 *versts* ($3\frac{1}{3}$rd miles) from the entrance to the Muzárt gorge.

This post now consists of half *sotnia* of Cossacks only, but up to 1870 a very much stronger detachment, called the Tián-Shán frontier detachment, held the upper course of the Tekes. When the intentions of the ruler of Káshgária to enter into an alliance with the Kuljan Sultán, in view to united action against the Russians, became known, the above detachment was moved to the Muzárt gorge in order to prevent the Káshgárian forces from crossing the Tián-Shán range and from giving aid to the Sultán of Kulja. This arrangement had effect, for, during the Kuljan campaign of 1871, the Káshgárians were not bold enough to appear as the allies of our enemies.

In 1873, the Tián-Shán frontier detachment was re-constituted and the Muzárt post was made a mere look-out station.

Under the protection, firstly, of the Tián-Shán detachment and then of the Muzárt post, a large Russian settlement, called the "Hunters' Suburb," was formed. This settlement lies in a picturesque valley, 28 *versts* ($18\frac{2}{3}$rds miles) to the west of the Muzárt post on the river Nárinkol, at its junction with the Kárakol, which is an affluent of the Tekes. The settlement in question is the furthest and most advanced inhabited point of Russian Turkistán.

5. *Frontier with Djungária.*—The eastern and south-eastern limits of the Turkistán Military Circle are shut in by the huge mountain ranges in the Tarbagatai, Djungár Ala-Tau and Trans-Ili Ala-Tau, and by the rivers Emil, Ili, and Tekes, which, after piercing through the mountains named, form, as it were, the gates to the ranges which generally divide them. Since there is no natural obstacle to an entrance into the valleys of the named rivers which run across the eastern frontier of Russian Turkistán, the locality in question was open to the inroads of hostile and plundering bands.

The anarchy which reigned in the western provinces of China, in the efforts of the Dungáns to throw off the yoke of the *Bogdikhan*, found an echo amongst the Russian Kirghiz on the borders of the province of Semiraitchensk. In order to keep those people out of the strife and to protect the Russian frontiers from the inroads of plundering bands, the following detachments were posted at the openings which have been named :—

1. *Southern Tarbagatai.*—At Bakta, on the site of Kok-Tuma, a former Chinese station, on the road between Urdjár and Chuguchak and 18

versts (12 miles) west of the latter point. This detachment consisted of 1 company of infantry, 1 *sotnia* of cavalry, and 2 guns.

2. Kaptagai, further south and not far from the former Chinese pickets of Aru-Tsindálas and Kaptagai. One company was here stationed.

3. Borohudzir on the river of that name which enters the Ili through its right bank. Strength of detachment one *sotnia* and two guns.

4. Tián-Shán on the river Tekes, of which mention has been made above.

The objects in the posting of these detachments were as follows :—

1. The preservation of our frontiers and of our Kirghiz subjects from hostile inroads.

2. The maintenance of order amongst the same people and the hindering them from wandering into Chinese territory.

3. The furthering of trade and the protection of trading caravans moving to Western China and back again.

4. In the event of the emigration into Russian territory of the several subject races of China, the offering to them of aid and protection so long as they continued to be loyal to their own Government.

Thus the four detachments above enumerated became as it were a row of mobile posts which closed the approaches to the eastern border of Russian Turkistán.

The attitude of these posts, looking to the character of the surrounding enemy, would be an active one, so that, on the appearance of any robber bands, these detachments had orders to cross the frontier in pursuit.

As the Southern Tarbagatai and the Borohudzir detachments had to be kept out for a whole year, barracks and other military buildings were erected for their protection against the bad weather and cold of the winters of 1868-69.

The instances of raids on Russian territory and the driving off of horses and cattle belonging to Russian Kirghiz were very frequent.

As a rule, however, the Russian detachments came up with the raiders and got back what they had carried off. The boldness of these raiders in 1869 reached such a pitch that they actually drove off the Russian artillery horses from the batteries stationed at Lepsinsk.

The raiders always reckoned on the swiftness and good quality of their own horses, and they concealed themselves on the difficult Barluk or at least Talkin mountains in the neighbourhood of Lake Sairám-Nor. The Russian detachments, therefore, after pursuing the raiders for a long distance across the border would be not a little fatigued. When the Kuljan Sultán Abil-Ogla began to aid the raiders in escaping, their inroads became especially bold and daring. Besides thus encouraging raids into Russian territory, the Kuljan Sultán would not allow Russian traders into his country. The lengthened negotiations with the Sultán regarding a change in his course of action led to nothing. There then remained but one remedy, *viz.*, to crush the Sultán by force of arms and to eradicate the den of thieves in Kuljan limits.

Accordingly, in May 1871, a portion of the Russian forces in the province of Semiraitchensk was concentrated at Borohudzir and thence moved forward. An end was then put by a few well-delivered blows to the independent existence of the Kuljan Khánate. With the conquest of Kulja, the instances of predatory inroads into Russian territory altogether ceased. Consequent on the new state of affairs on the frontier, the Kaptagai detachment was removed, the Tián-Shán post replaced, as we have said above, by the Muzárt picket, whilst the localities chosen for the Southern Tarbagatai and Borohudzir detachments respectively were called Forts Bakhti and Borohudzir. The former of these, being opposite Chuguchak, is situated directly on the frontier with China, whilst by the occupation of the latter the Kuljan region came into the possession of our troops.

Forts Bakhti and Borohudzir likewise afford protection to the Russian settlements contiguous thereto.

The Kuljan region.—By this term is signified all the territory which formed part of the Khánate of Kulja, and that which, subsequent to 1871, came under Russian rule, *viz.* :—

1. The valley of the Upper Ili, as indicated on the right by the Borokhoro range (*i.e.*, the Talkin or Iren-Habirgán), and on the left by the Uzun-Tau range, with its diversified population of Taránchis, Dungáns, Chinese, Mandjoors, Kálmaks, Solons, Sibos, Kirghiz, &c., &c.

2. The valley of the river Borotola and lake Ebi-Nor, beyond the Borokhoro range. This valley is peopled by (*a*) Kizai-Kirghiz and Baidjigits, races which used to take the leading part in the raids on Russian territory and in giving trouble to the Russian settlers and detachments at Tarbagatai, Kaptagai, and Borohudzir; (*b*) Chahár-Kálmaks dwelling on the lower Borotola and Kiitina; (*c*) Torgouts, a Mongol race akin to Kálmaks. In the same tract we must also include three settled points peopled by Chinese, *viz.*, Takiánza with about 200 families, Jin-Ho with 352 families, and Shikho with 76 families. These three points lie at the northern base of the Talkin range, on the great Imperial road made by the Chinese from Kulja to Pekin. The population of Shikho consists of exiles who were driven forth during the Dungán rebellion in the town of Kar-Kára-Usu, which lies 25 *versts* (16⅔rds miles) from the junction of the Kuljan and Chuguchak roads. The fugitives from Kar-Kára-Usu found refuge 10 *versts* (6⅔rds miles) to the north-west of their own homes. In 1872 the territory comprised within the above limits was restored to China.

3. The valley of the river Tekes, peopled by Kálmaks and Kirghiz, who also used to make inroads on Russian territory.

Besides these tracts, after the subjugation of the Kulján Khánate, the Torgouts who nomadise on the Upper Kunges (an affluent of the Ili), in order to secure themselves from the Káshgárians, sought Russian protection and claimed to be held Russian subjects.[1]

The latter question as affecting these Torgouts is not yet decided, but protection was accorded to them on the understanding that they paid tribute. Hence the valley of the Kunges must also be considered as belonging to Russia.

In order to hold the Kuljan region (inclusive of the line of the Kunges river) and to preserve order in the town of Kulja and at Fort Suidun 40 *versts* (26⅔rds miles) to the west of Kulja, a portion of the Russian forces in the province of Semiraitchensk is detached. This detachment consists of 7 companies of the 10th and 2 companies of the 1st Turkistán Line Battalion, 4 *sotnias* and 6 guns.

---

[1] A small portion of these Torgouts encamped in 1871 in the basin of the Borotola.—*Author.*

The Kuljan region now comprises, so to speak, the advanced post of our Central Asian possessions and covers the flank of our Semiraitchensk province.

In an administrative sense the Kuljan region is divided into two districts, and at the head of each is placed an official who is subordinate to the Governor of the Province of Semiraitchensk. The officer commanding the Russian detachment in the Kulján region is held to be commander of the force in the same tract. The town of Kulja is connected with the Semiraitchensk province by a post road which was opened in 1872.

Having examined in as much detail as possible the *outer* line of fortified posts, let us turn to the *inner* or *reserve* line. This consists of Fort No. 1 (Kázalinsk), No. 2 (Káramakchi), Perovski (the town of Perovski, or, as the natives call it, Ak-Masjid or Ak-Mechet), Forts Julek, Turkistán, Chimkand, Chináz, Táshkand, Aulie-Ata, Tokmak, Vairnoye, (Almata), Kopál and Sergiopol.

However small may be the garrisons which hold the outer or advanced line of fortified posts, those of the inner or reserve line are still smaller. With the exception of those of Táshkand and Vairnoye, they usually consist of 1 company and of a *sotniá* or ½ *sotnia* of Cossacks.

Táshkand is the central point in which is concentrated the bulk of the troops that form a reserve to the whole of the advanced line. Here then are stationed six infantry battalions (four rifle, one line, and one local), five *sotnias* of cavalry, three batteries of artillery, and one sapper half-battalion. A portion of these troops can be moved in all directions to reinforce the troops operating over any theatre of war. Such was effected in 1868, when from Táshkand reinforcements were sent to the troops operating against the Amir of Bukhára; in 1870 when the troops operating against Shahr-i-Sabz were strengthened; in 1871 when several companies were marched to the Semiraitchensk province; in 1873 when a considerable portion of the Táshkand garrison took part in the Khivan Expedition; in 1875-76 during the expedition to the Khánate of Khokand; and in 1878 when Russian troops were concentrated at Jám.

In the town of Vairnoye are posted three battalions (two line and one local), two *sotnias*, and two batteries of artillery. These serve as a reserve to the advanced detachments in Semiraitchia.

The following is a general description of the Russian Turkistán fortified lines. The Turkistán Military Circle lies lengthwise from west to east, its front projecting out in the form of a semi-circle. Along this outer projection are distributed the advanced line of forts; within are what are now the reserve, but which were in their turn the advanced chain of posts. These inner posts are connected by a postal road with branches to the several links in the chain.

The forts of Turkistán would not, from a European point of view, stand criticism, and indeed are hardly worthy of the designation of forts. In wars with a European enemy they could offer no sort of serious opposition, but against a Central Asian foe they would present an insuperable bulwark.

Certain of the fortified points of Russian Turkistán bear the name of *forts*, others of *fortified positions*, and others again of *fortresses*. But such designations are arbitrary, and the greater number of points are indiscriminately termed now *fortresses* and now *fortified posts*.

These may be classified, then, under two categories: (*a*) such as have been made by the Russian soldiery; (*b*) such as have been adapted from Central Asian fortresses, chiefly from native citadels. The former are mostly found in districts frequented by nomads, and the latter in localities taken up by the settled population. The tracing of the former class puts one in mind of temporary field works, for all, whether redoubts, trenches, or of whatever description, are very discretionary in their outlines. For instance, Fort Julek has the appearance of a lengthened rhomboid, with towers at the corners. Inside the towers are the powder magazines, whilst on the ramparts of the same are placed the guns.

The forts of the second category are unlike anything European. After the capture of a Central Asian town [1], the Russian detachment, being numerically weak, would occupy only a portion of the defensive wall, generally the citadel. This portion would then be repaired, ramparts and barbettes would be made for the guns, embrasures cut, esplanades cleared [2], &c., &c. As the want of space for even a small detachment would have a pernicious influence on the health of the troops, in the fort thus improvised would be left but a small portion of the detachment, the rest would be quartered outside the walls in any native huts that there might be, or, failing these, in barracks run up in the native style.

Inside the citadel would be formed the hospitals, store magazines, artillery and engineers' depôts, &c.

Outside, and protected by the troops holding the citadel, would be built the private houses of the officers, the shops of the sutlers, the bath-houses, &c. In this way would spring up a suburb forming the nucleus of a future Russian town, which with its own fort would be side by side with the native city, and yet presenting in its surroundings and mode of life an appearance completely different to that of the native quarter.

Thus every town of Turkistán is divided into three parts, Russian fortress, European quarter, Asiatic city. The fort of Táshkand, however, has not been built out of the last citadel but *de novo*. In shape it is a bastioned hexagon, of field profile, with a circumference of about a mile.

The citadel commands the town, and the guns of its ramparts are turned so as to threaten the Asiatic bazar.

In the case of the Sámarkand fort which was adopted from the native citadel, the Russians, in order to strengthen the works, cleared the way for an esplanade by throwing down a large number of the adjoining houses and making a straight and wide street right up to the *Rigistán*, or market place. This street and open space is thoroughly well enfiladed by the guns of the fort.

There is yet another kind of fortified point in Turkistán of which the sole strength lies in the bravery of the garrison. Of such a description are Forts Bakhti and Borohudzir. These have no walls, but comprise merely the barracks in which the Russian troops are quartered. Neither are there any defensive works at the Muzárt post. The rôle of all such points is purely an active one.

The works of such fortresses as have been adapted from native citadels are very unsatisfactory, for they are generally in a crumbling condition and require constant repair. But, notwithstanding the weakness in a European sense of all the fortresses of Russian Turkistán, they are good enough as regards a local enemy. The instances would, indeed, be rare in which the natives would dare to attack a Russian stronghold.

[1] A Central Asian town is generally also a fortress, *i.e.*, it is surrounded by a wall.—*Author*.

[2] Esplanades are not added to Central Asian fortified towns.—*Author*.

Almost all the troops of the Turkistán Military Circle are located in barracks. At Vairnoye there are only three companies which, owing to the insufficiency of barrack accommodation are billetted, during the winter, on the native inhabitants.

The necessity for providing barrack accommodation for the troops of the Turkistán Military Circle is the greater, because the troops are scattered about, and because of the mode of life of the native population. The settled Mussulmán inhabitants are too exclusive to permit of Russian soldiers being billetted in their dwellings, whilst to locate them in the *kibitkas* of the nomads is likewise impracticable. Besides which the military conditions of the country are such that a portion of the Russian troops must be constantly near at hand, whilst the supervision over all must be incessant.

Where, then, there are no barracks, the troops are located in either mud huts or felt *yurtas* or, finally, in bivouacs.

Up to a recent period the barrack accommodation of the Turkistán Military Circle consisted either of native mud huts made in some degree fit for habitation by the Russian soldiers, or of buildings erected by native workmen. Both the one and the other were small, confined, low, badly ventilated, and often damp. They were made either of lumps of clay or of sun-burnt brick. Their ceilings of trodden-down earth served also as roofs, transverse beams would first of all be laid on the walls, and across these rows of thin sticks or simply reed matting. It goes without saying that such a roof must leak and introduce damp into the dwelling, and this would be increased by the fact that the walls would have no foundation, rising straight up from the ground. Besides all this, in the majority of cases a water-course (*arik* or *kanáva*) for the irrigation of the trees around, would flow past the walls, near which in Turkistán it is necessary to plant trees of a shade-giving kind. These water-courses, then, cannot but percolate into the walls, especially in localities wherein the soil is saline and the walls are made of it; as, for instance, in the case of the forts along the Sir-Daria. There the barracks very soon deteriorate, and require constant or, as one might say, ceaseless carrying on of repairs. The building and repairing of his barracks take up much of the time of the Turkistán soldier; whilst the damp and other bad hygienic conditions injuriously affect his health. These causes were especially destructive during the first years of the Russian occupation of the country, wherein they exacted so many victims from the ranks of the Turkistán soldiery.

The number of military buildings and of barracks in the Turkistán Military Circle is immense, numbering thousands, and yet the quartering of the troops cannot but be termed crowded. The cause of this is that the native huts which are used for the troops are small.

The dearness and general insufficiency of building material arising from the absence of forests in the country, a cause, which whilst limiting the number of both technical and working hands, has, since the occupation of the country, yet necessitated the construction of new buildings for the occupation of Russian troops according to the pattern of native dwelling-places. This system consists in the connection of wood with clay. Vertical wood posts with transverse pieces are filled in with either lumps of clay or with sun-burnt bricks.

In order to check the leaking of the roofs of their barrack buildings, the Russians first of all thought of smearing them over with asphalt, which is procurable within the limits of the province of Fargháua (Khokand). But the experiments to this end, which were carried on at Táshkand during the years 1869-70, led to no satisfactory results. The object in view was incontestably better attained by using sheet-iron, and with this, since 1873, the roofs of many of the military buildings of Táshkand have been covered.

Besides, too, the use of this new description of roofing material, many complete changes and improvements have been introduced in the matter of barrack building. Thus barracks are now made more spacious and lofty, the walls too are raised over a fundament, and the plinth is of kiln-burnt brick, by which the percolation of damp from the soil is averted.

The barracks on this new plan, which are taking the place of the former dwellings, are fairly spacious, light, and dry; these improvements then cannot but favourably influence the health of the inmates and lessen the percentage of the sick.

Whilst on the subject of barrack accommodation, a few words regarding the stables must not be omitted. If the abode of the human beings in the Turkistán Military Circle cannot be called luxurious, nothing remains to be said of the places in which the animals are put. As regards the treatment in this respect of horses and horned cattle at the hand of the natives, the endurance of dumb animals is simply Spartan. The places in which horses are put have no roof covering of any kind, so that throughout the year they stand under the open heaven. Of late years, however, in the large centres of Turkistán sheds have begun to be erected for artillery horses. The Cossack horses, on the other hand, are nearly everywhere still without even this protection. It is necessary to observe that sheds afford an ample protection for horses in Turkistán because severe winter frosts do not occur, whilst for summer occupation sheds are much cooler than built up houses.

CHAPTER II.

ARMAMENT OF THE TURKISTÁN TROOPS.

Armament of the Infantry, Artillery, and Cossacks—Armament of the Forts—Supply of *matériel* and of lead—Laboratory and Arsenal of Turkistán—Parks—State of the Artillery *matériel.*

On the 1st January 1879, the infantry force in the Turkistán Military Circle was armed as follows: battalions of the Turkistán Rifle Brigade, 3rd and 9th Line Battalions, with small-bore rifles of the Berdan pattern of 1868; all the local and the remainder of the line battalions and the levies[1] with the small-bore rifle on the Berdan system, No. 2 pattern of Birmingham manufacture. Now, however, all the line and local battalions have been re-armed with small-bore rifles of No. 2 pattern as prepared in Russian workshops.

---

[1] Formed, it is believed, in part of Russian colonists. In none of the military reports that I have seen on Russia's forces in Central Asia has the slightest mention been made of the large number (increasing yearly) of Russian colonists whose services can be utilised either to take the place of the ordinary garrisons or to supplement armies of operation. These colonists are composed of old soldiers so that their training has been completed.—*Trans.*

It is undoubted that the arming of troops comprises one of the important elements towards success in battle; but in Central Asian wars any weapon in the hands of a European disciplined soldier will be a good one. With native troops, on the other hand, the same thing cannot be said, because, though they may be armed with the most perfect weapons in the world, they can do nothing against their European foes, since they lack the chief element of success, which is discipline.

Moreover, the difference between the armament of the Russian soldier and that of the Central Asian warrior is as great as in the contrast between them in respect of this quality—discipline.

The range and accuracy of our infantry weapon keep, on the battle field, our soldiers without the circle of impact by the missiles of the natives' flint-lock arm. Hence our losses in the several engagements have not been great.

The field artillery in Russian Turkistán is armed with 9, 4, and 3-pounder breech-loading guns.

The Cossacks have the small-bore "Cossack" rifle and revolvers of the Smith and Wesson pattern.

In the armament of fortresses we find smooth-bore field guns and 4-pounder muzzle loaders, 18-pounder howitzers, 18-pounder mortars, four 6-inch rifled muzzle-loading mortars, and four 6-inch breech-loading mortars. Besides these, at the close of the year 1878, 40 mittrailleuses were sent out for distribution by the head of the Turkistán Ordnance Department. Of these, 30 are with the Táshkand fortress artillery and 10 are at Vairnoye. They are formed into separate batteries.

The provision of the troops with war stores is maintained entirely and regularly from the laboratory at Táshkand.

Ammunition (powder, lead, &c.) is brought exclusively from European Russia. The small productiveness of the Turkistán Military Circle does not permit of any of the artillery stores being prepared on the spot. An attempt was made in 1869 to obtain a supply of lead from the local mines in the Kára-Tágh mountains, the working of which was carried on by the natives prior to the arrival of the Russians; but, owing to the want of technical knowledge of mining, the outturn was insufficient, since which the lead for the artillery requirements of the Turkistán Military Circle has once more been imported from Russia.

The lead mines above named passed, on the occupation of the country by the Russians, into the hands of the Russian merchant, Pervushin. The local officials wishing to encourage local industry, and with a view to cheapening supply, gave Pervushin a contract for local lead to meet the requirements of the year 1870, but, as has been said, the arrangement ended in failure.

The requirements both of field and siege artillery are supplied from the Circle arsenal at Táshkand. The resources of this arsenal are such as to enable not only the wheels of the gun-carriages to be made, but also the preparation of the ammunition boxes. The difficulty experienced in the above arsenal is the insufficiency of good wood. The locally-cultivated kinds of timber, such as poplar, willow, elm, on account of their small degree of density, are not in every case suited to the purpose. Under these circumstances it was indispensable to import wood from Russia; a proceeding attended with great expense, since the yearly demand in Turkistán for material for artillery manufacturing purposes amounts to from 8 to 9,000 *roubles* (from £1,000 to £1,125). In order to avoid this expenditure, some years ago a tract was, on the initiative of the head of the Ordnance Department of Turkistán, set apart, outside the town of Táshkand, for the raising of 30,000 specimens of various species of wood suitable for artillery purposes, such as elm,[1] hazel, maple, mulberry, and poplar.[1] This preserve will very soon be able to supply the local demands both in respect of quality and quantity. The undertaking has up to the present time cost several thousand *roubles*, but the advantages expected from it in the future will be considerable.

There are no field or siege parks in Turkistán. When an expedition is about to take the field, field parks are formed and the *matériel* is carried either in camel boxes or in hired carts. At the close of the particular expedition these field parks are at once broken up.

Reserves of artillery stores are always complete, and are kept up principally by consignments from the arsenals of European Russia under the direction of the head of the local Ordnance Department.

CHAPTER III.

SUPPLIES OF CLOTHING, PROVISIONS, AND FORAGE.

Clothing of the Turkistán soldier, and periods for which it is required to last—Cossack uniform—Issue to the Turkistán soldier of intrenching tools—Issue of flour and of biscuits —Forage, barley, *jugára,* lucerne grass—Green corn for the horses.

The clothing of the Turkistán soldier is as varied as are the localities in which he serves. Climatic conditions on the one hand, and economic on the other, have provided him with a dress which is in sharp contrast with that of his European compatriot.

For the greater part of the year he wears his gymnasium linen blouse, with cloth shoulder-straps, chamois-leather trousers (*chambárs*) dyed red, and a white képi with hind flap to protect the back of his neck from the burning rays of the sun.

The blouse is renewed annually, the *chambárs* biennially. The latter description of garment was adapted from the natives; it is durable, cool in summer; it protects the legs from thorns, &c., and is peculiarly fitted for mounted duties. Officers are allowed to wear this article of dress but only on campaigns.

Instead of a knapsack the Turkistán soldier carries a woollen *havresac,* an article which is much better suited as a weight across the back than is a knapsack.

The style of uniform for the Turkistán soldier was laid down by an order of the Military Department dated 26th April 1869, No. 149. By this order the summer pantaloons formerly in use were replaced by grey cloth *chambárs,* and the periods of issue of the ordinary uniform coat and dark green cloth *chambárs* were altered to every fourth and second year respectively. In European Russia the same articles are issued every second and third year. The changes in the periods of issue in the case of the Turkistán soldiers were regulated by the hot climate of a country in which the ordinary cloth uniform is but seldom worn, whilst the cloak both on the march and in quarters is brought oftener into use, and principally at night when it gets cold.

---

[1] The author has stated above that these kinds are *not* suited to the purpose.—*Trans.*

The practice, however, of several years showed that the fourth yearly issue of the uniform coat is too long delayed, since it is worn out before the period in question expires, whilst the cloak might well serve out a longer period.

Hence, by an order of the Military Department, No. 341 of 1875, the period of issue of both cloth uniform coat and cloak has, in Turkistán, been fixed at three years.

As regards the issue of boots, by an order of 1869, No. 149, it was directed that the regulation number of two pairs with long leggings should be altered to three pairs with leggings 21 inches long (formerly the allowance was three pairs with leggings 30 inches long (Cossack pattern). The two pairs are thus issued: first year, complete pieces of leather for one pair of boots and leggings, with allowance for shaping, sewing, and lining, at 30 *kopaikas* (*9d.*) *per annum;* second year, leather for top pieces and soles (no legging), and money 19½ *kopaikas* (about 6*d*).

The under-linen of the Turkistán soldier is made of the native cotton web known as *biáz.* This portion of the soldier's equipment is fixed by Military Department order No. 15 of $\frac{\text{21st January}}{\text{2nd February}}$ 1870. The adoption of *biáz* in lieu of Russian linen was due to the great cheapness of the former as compared with the price the latter: an *arshin* (28 inches) of *biáz* costs on the spot from 5 to 10 *kopaikas* (1½*d.* to 3*d.*) according to the width and compactness of the particular web.

The practice of several years has shown that *biáz* becomes softer by washing, and consequently is more agreeable to the wearer than linen; but in durability it is far inferior, especially during work or campaigning, when it becomes much torn and soon wears out. This is the reason of the complaints made by the troops to the Intendance Department. In consequence of these complaints the Turkistán local authorities have collected data regarding the durability of *biáz,* in order to settle the question as to increasing the issue of the material or to lessening the period for which each issue is required to last.

Cossacks serving in Turkistán wear shirts made of camel's hair, known as *armyáchina,* instead of the linen blouse above spoken of. Being of a grey colour they are less easily soiled, and they are—which is most important—extraordinarily durable, a quality which is very material in respect of mounted duties and the peculiarities of Cossack service. The period for which each grey shirt is issued is from 2 to 2½ years. This article has been in use amongst the Cossacks since 1865.[1]

Whilst on the subject of the equipment of the Turkistán soldier, mention must be made of pioneers' tools, because this portion of the soldier's kit is likewise very varied in pattern.

In Turkistán, both in peace time and in war, a much greater demand for pioneers' tools is felt than in other parts of the Russian Empire. This demand arises from the constant moving about of the Turkistán troops and from the numerous buildings and works on which they are engaged in time of peace.

In war time the necessity for pioneers' tools is still more apparent, for then they can neither be purchased nor indented for. Moreover, the properties of the soil at which the Turkistán troops have to work are such as to require the use of tools that are adapted to that soil, such as the Sárt shovel or *ketmen*. A project for the equipment of the Turkistán troops with pioneers' tools answering to the above requirements, was worked out, and, on the basis of this project, tools were in 1872 issued in the following proportions :—

---

[1] Greater details on this subject have been given in the earlier pages of this Volume. —*Author.*

(*a*) Turkistán Line Battalions,—20 axes, 10 shovels, 5 spades, 25 *ketmens* or Sárt shovels, 40 straps and buckles.

(*b*) Rifle companies,—12 axes, 6 shovels, 3 spades, 15 *ketmens*, 24 straps and buckles.

In the Turkistán Rifle Brigade, the two Turkistán Artillery Brigades, pioneers' tools were issued, according to the scale of 1872, as follows :—

To each battalion of the Rifle Brigade, 40 axes, 40 shovels, 12 spades, 12 mattocks with handles, 3 ten-pound crowbars.

To each battery of the Artillery Brigade, 16 axes, 16 shovels, 4 spades, 4 mattocks with handles, 2 ten-pound crowbars.

Before the establishment of the Turkistán Military Circle, when the Russians occupied the infertile Kirghiz steppes only, the victualling of the Russian troops in Central Asia was maintained by imports from European Russia. But after the Russian occupation of the fertile tracts along the course of the Sir-Daria and of its affluents, it became possible and even cheaper to supply the Turkistán troops with rations and forage from local resources. Although at first the fresh demand for agricultural products raised prices, the area of cultivation was subsequently extended, and soon the prices of grain and of forage returned to their normal rates.

With the exception of the northern portion of the province of Semiraitchensk, where rye is raised, wheaten flour is now exclusively supplied to the troops throughout Turkistán ; groats, maize, barley, and rice, are also issued.

The kinds of flour in Turkistán are very few, and these are regulated not by the process of grinding, but principally by the quality of the grain in the ear. The principal kinds are obtained (*a*) from irrigated wheat crops (*i.e.*, from *abi* or *teramoi* land), and from rain-watered wheat crops (*i.e.*, from *lialmi* or *bogárni* land). The quantity of waste in the grinding amounts approximately to 10 lbs per *batmán*.[1]

The chief descriptions of forage in Turkistán are barley, *jugára* (sorgho), and lucerne (*jenushka*), which is used as hay. In the northern districts of the province of Semiraitchensk and in the Kazála district of the province of the Sir-Daria meadow hay and sometimes oats are obtainable, but in all the other parts of Turkistán such products are not known.

Although in Turkistán barley crops are widely distributed and in fact take the place of oats, it seems that the former grain is much less satisfying to a horse than the latter. In consequence of the greater dryness of its grain, a horse digests barley with difficulty—indeed a considerable portion of the feed passes out into the dung wholly undigested. It has been observed, too, that to take a horse from hay or lucerne to barley much greater caution is necessary than to take it from the same description of forage to oats, because in the former case great constipation frequently sets in, and this may occasionally terminate in inflammation of the bowels and in death. The price of barley at Táshkand varies from 20 to 40 *kopaikas* (6*d.* to 1*s.*) per *pud,* (36 ℔s).

---

[1] At Táshkand a *batmán* = 10½ lbs.—*Author.*

In some parts of the province of the Sir-Daria, the Zarafshán Circle, and the Amu-Daria section, in place of barley, *jugára* (*sorgho*) is used. *Jugára* is much more nutritive than barley, and therefore its issue is proportionally less. *Jugára,* too, is sometimes bought for the Government horses when there is a lack of barley in the bazaar.

Russian horses do not at once begin to eat *jugára,* but only get accustomed to it by degrees. The reason of this is that *jugára* is harder than dried barley. The price of *jugára* at Táshkand is about 30 *kopaikas* (9*d.*) a *pud* (36 ℔s).

This vegetable growth is very widely diffused over the Khivan Khánate, wherein it forms the food of the people as well as of their animals.

Lucerne (*jenushka*) sowings take up not a small portion of the cultivated land of Turkistán. The advantages of this crop are very evident, since a field once sown over with it yields rich hay for 10 years without scarcely any care, if we leave out of the calculation the great labour involved in flooding the field with water seven times every summer.

Lucerne is cut five times every year, and a *tanap* (= ⅙th *desyatína,* about ½¼ths of an acre) of land will yield in one crop from 150 to 200 bundles of hay, *i.e.,* from 90 to 140 *puds* (= 1½ to 2⅓ tons) of hay *per annum.*

Lucerne is given to horses both in a green and dried state. It is generally bound up in sheaves and sold by the hundred. Its cost is very varied, being regulated both by the locality and the season of the year. At Táshkand the price of 100 bundles or sheaves of lucerne will fluctuate from 1½ to 5 *roubles* (3*s.* 9*d.* to 12*s.* 6*d*). When barley is also allowed, 10 ℔s of lucerne *per diem* quite suffices for the feed of a horse.

For several weeks in each year both Cossack and artillery horses enjoy green fodder; but unfortunately this kind of food is very scarce over the greater part of the Sir-Daria province and the Zarafshán Circle, so that the period of its use is not very long, the grass drying up from the heat of the sun's rays in the beginning of May (old style). In the province of Semiraitchensk, on the other hand, meadow tracts are of larger area and the period of green fodder of longer duration.

CHAPTER IV.

SANITARY CONDITIONS OF THE LIFE OF THE TURKISTAN TROOPS.

Return of sickness amongst the troops for the ten years between 1867 and 1876—Men invalided—Influence of particular localities on the sickness and mortality amongst the troops (Jizák, Chináz, Tokmak)—Tables of sickness and mortality, according to branch of the service, physical development, period of the year, nature of disease—Epidemics amongst the troops—Intermittent fevers and Typhus—Cholera—Tables of sickness and mortality grouped according to diseases—Measures adopted for the preservation of the health of the troops since Turkistán was first occupied by the Russians.

During the ten years from the establishment of the Turkistán Military Circle, *i.e.,* from 1867 to 1876 inclusive, the relative figures of the sickness and mortality amongst the Russian troops, and also of the number of men invalided, are arranged in the following table.

	1867.	1868.	1869.
	Epidemics of remittent fever and blotchy typhus.		
(*a*) ADMISSIONS :			
Into head-quarter hospitals . . .	16,233	20,615	15,758
Into district hospitals	4,024	13,484	15,576
Of these (with the balance of preceding years the figures of which have not, for brevity's sake, been shown)			
THERE RECOVERED—			
In the head-quarter hospitals . . .	14,619	20,023	15,489
In district hospitals	3,672	13,186	15,604
THERE DIED—			
In head-quarter hospitals	812	1,294	294
In district hospitals	3	8	—
(*b*) DISCHARGED AS INVALIDS . . .	85	103	120
Under Article I	55	47	43
,, ,, II	25	29	55
,, ,, III	5	27	22
Average numerical strength of the Russian troops in Turkistán . . .	23,166	24,143	25,375
PERCENTAGE OF SICK *per mille* OF STRENGTH—			
In the head-quarter hospitals . .	700·72	853·87	617·06
In district hospitals	917·37	1,412·37	1,234·83
PERCENTAGE OF DEATHS *per mille* OF STRENGTH—			
In the head-quarter hospitals . .	35·05	53·63	11·58
In district hospitals	3·06	4·26	4·72
PERCENTAGE OF RECOVERIES *per mille* OF SICK—			
In the head-quarter hospitals . .	899·05	971·49	980·69
In district hospitals	902·94	973·89	992·30
PERCENTAGE OF DEATHS *per mille* OF SICK—			
In the head-quarter hospitals . .	50·02	62·76	18·65
In district hospitals	40·23	38·18	9·38

1870.	1871.	1872.	1873.	1874.	1875.	1876.
Epidemics of remittent fever.		Cholera epidemics.		Epidemics of remittent fever and blotchy typhus.	Epidemics of bowel typhus.	
18,362 18,248	20,741 28,654	19,684 27,277	14,869 23,031	12,504 26,842	13,992 25,515	15,240 31,665
17,573 18,457	20,137 28,441	18,855 27,412	14,556 23,056	12,131 26,722	13,681 25,575	14,401 31,433
499 —	655 3	1,022 16	328 11	333 10	377 14	499 6
147	206	143	137	135	174	438
58 60	88 90	56 70	61 57	49 74	69 82	73 197
29	28	17	19	12	23	168
26,743	29,349	32,247	30,373	31,068	35,991	45,298
686·60 1368·95	706·70 1683·02	610·41 1456·29	489·87 1247·81	402·47 1266·44	388·76 1097·41	336·43 1035·47
18·65 5·49	22·31 7·01	31·69 4·43	10·79 4·51	10·71 4·34	10·47 4·83	11·01 9·66
952·61 984·15	971·54 983·45	955·87 985·22	976·90 992·40	969·45 987·49	978·86 993·64	944·94 977·16
27·17 13·60	31·57 13·22	51·92 22·10	22·06 8·94	26·63 8·71	26·94 9·86	32·74 10·76

From this table it will be seen that the *maximum* of sickness and of mortality occurred in the first year of the existence of the Turkistán Military Circle, consequently at a time when it was impossible, on account of disorder through political events, and of insufficient acquaintance with local conditions, to give entire attention to the proper organisation of sanitary measures for the troops. The epidemics of remittent fevers and of typhus occupied, during the years 1867 and 1868, the first places in the decade under review, both in regard to the sick and to the number of fatal cases. After them, in 1872, the number of deaths stands out, and this because of the fierce cholera epidemic of the year in question. The number of sick in the other years, beginning with 1871, which year occupies the second place in the entire decade under review, decreased yearly until, during the last year under examination, the number of sick fell to less than half, as compared with the figures of the year 1871. The mortality, however, amongst the troops of the Turkistán Military Circle during the ten years, does not show the same favourable results as we have seen in the case of the sickness, *i.e.*, a steady reduction of the number of fatal cases is not apparent. But the years 1873, 1874, and 1875 occupy in this respect the last places. The year 1876 alone shows a rate of figures considerably higher than those of the above three years. This fact is due to certain exceptional conditions affecting this year, with regard to the sanitary state of the troops which brought the year 1876 very close to the first years of the decade. Thus during the year in question there arrived in Turkistán four battalions and nine local levies. Certain of these having set out on the march too early in the year, and having suffered through a want of supplies and through other unfavourable conditions, arrived at Táshkand during a season of unusual sickness caused by fever. These battalions, &c., consequently had a number of diarrhœa cases which added largely to the percentage of sickness and of mortality, and thus unavoidably added to the general total of deaths in Turkistán for that year, causing it to have an excess of deaths over those of the preceding year.

With regard to the invalids, the table on pages 166 and 167 shows that in the last year, and especially in 1876, the number considerably increased. This circumstance is in all probability connected with the bringing into operation of the new regulation regarding military conscription.

It must be supposed that the conscripts who now enter the service at a very early age are more subject to all the disadvantages of a military life because of the non-completion of their organic development, and that therefore they can present less opposition to the several sickness-producing influences around them, and hence go more certainly to swell the roll of invalids. Regarding the influence of the several localities on the sickness of the troops quartered in them, it is difficult to say anything definite. It has been generally remarked, however, that only three places have steadily stood at the head of unhealthy localities, *viz.*, Jizák (where the sickness and mortality amongst the troops have always been at the highest figure), Tokmak, and Chináz. But the precarious influence of Jizák on the health of the troops has proceeded not so much from climate or from soil as from the fact that this point was at first the Russian advanced post,—a post garrisoned by a large number of troops crowded in damp, confined, and hastily-erected barracks. Moreover, the troops there stationed underwent excessive duty, arising from the necessity of constant preparedness for any military operations. With the transfer of the Russian advanced line of post to the Zarafshán Circle it has been found possible to almost denude Jizák of troops, leaving but a very small contingent to serve, as it were, as an *étape* towards the advanced posts in the Zarafshán Circle and as a link to the general reserve at Táshkand.

At Chináz the same hurtful influence on the health of the troops was traced to the same causes. At Chináz there is now only one local levy.

Tokmak enjoys a bad reputation for unhealthiness, because it is surrounded by a marsh which has a bad influence on the health of its garrison. But the draining of this bog and the improvements made in the hygienic conditions of the barrack life of the Tokmak detachment are telling by degrees on the rate of sickness of this garrison.

It has generally been noticed that the hard life at a post and new, confined, and damp barracks, and not climatic or soil conditions, have principally affected the percentage of the sickness amongst the troops of the Turkistán Military Circle.

With improvements in the, so to speak, domestic life of the soldiers, sickness has been reduced. Thus Táshkand, which in 1869 gave a rate of sickness represented by 940·3 per 1,000 of the garrison, with unchanged conditions of climate and considerable increase to its garrison, showed in 1876 only 470·15 per thousand of sick cases. The same reduction, too, has taken place in other towns.

At Vairnoye, where in 1869 the sick were represented by 960·3 *per mille* of the garrison, in 1876 there were only 300·65 *per mille* of sick cases.

At Kátta-Kurgán the figures for 1869 and 1876 were as follows:—1060·9 and 112·85 *per mille.*

At Jizák—In 1869, 1100·5; and in 1872, 125·00 *per mille.*

At Peter-Alexander—In 1873, 156·00; and in 1876, 102·97 *per mille.*

As affecting the several arms, sickness and mortality are thus classified: During the ten years under review, the *maximum* of sick was amongst the ranks of the auxiliary forces and is represented by 840·46 *per mille* of strength. Then came local levies 545·92 *per mille,* infantry 540·69 *per mille,* irregular troops 536·46 *per mille,* artillery 515·02 *per mille,* engineers 486·38 *per mille;* and lastly, the employés of the laboratory 448·07 *per mille.*

The highest rate of mortality was amongst the engineers, *viz.*, 27·23 *per mille;* then followed, infantry 21·06 *per mille,* irregular troops 21·01 *per mille,* auxiliaries 20·61 *per mille,* artillery 16·77 *per mille,* local levies 14·68 *per mille,* and employés of the laboratory 13·60 *per mille.*

Of sick per thousand there died, engineers 51·95, irregular troops 39·15, infantry 38·99, laboratory employés 34·74, artillery 32·41, local levies 26·85, auxiliaries 24·84.

On the basis of such data as we have, the deaths amongst the troops during the decade under review were found to be arranged according to age, thus:

	Per cent.
Under 20	0·98
„ 21	1·70
„ 22	4·96
„ 23	7·24
„ 24	6·74
„ 25	9·54
„ 26	8·38
„ 27	7·83
„ 28	8·03
„ 29	5·70
„ 30	6·39
From 30 to 35	9·36
„ 35 to 40	6·57
„ 40 to 45	2·45
Above 45	1·75
Unknown ages	2·38

Thus it will be seen that the *maximum* rate of mortality was amongst those of 25 years of age, and the *minimum* amongst those who had not attained to the age of 21.

As regards the influence of the season of the year on the health of the troops, the following figures may be cited. They are taken from the reports for 9 years only, as information for 1876 is not forthcoming. The *maximum* rate of sickness during these 9 years was found to be in September with a rate of 10·72 per cent.

After September followed in the order given below :—

	Per cent.
July	10·63
August	10·41
October	9·48
June	8·83
November	8·33
May	7·78
April	7·29
January	7·07
December	6·93
March	6·41
February	6·12

The maximum rate of mortality was found to be in June with a rate of 12·54 per cent. After June followed with progressive reduction of fatal cases :—

	Per cent.
July	9·98
October	9·07
August	8·93
November	8·77
September	7·92
December	7·64
January	7·41

	Per cent.
March	7·33
February	6·89
May	6·77
April	6·75

The great preponderance of sick and fatal cases during the half year ending with November over those during the other half of the year is dependent on the period of the arrival in the country of fresh troops or of parties of conscripts to complete the strength of the Turkistán forces. All the typhus cases in the Circle during the ten years were introduced by the said troops and parties of conscripts. Since, too, such reinforcements usually arrived during the half-year above indicated, the great increase of sick and fatal cases is thus accounted for. These cases fell off on the final breaking up of the fresh parties or on the arrival of the several detachments at their respective destinations, when sanitary measures on an extended scale could be applied to them and with the most favourable results.

The kinds of sickness and the causes of mortality amongst the troops of the Turkistán Military Circle during the decade under review is shown in the appended table :—

	Per mille OF STRENGTH.		*Per mille* OF SICK AND FATAL CASES.		*Per mille* OF SICK ONLY.	
	Sick cases.	Deaths.	Sick cases.	Deaths.	Sick cases.	Deaths.
Pestilent diseases	440·15	18·04	772·009	833·94	956 97	40·98
Cacochymic and organic diseases	32·59	2·50	57·14	114 91	912·99	76·29
Contagious and parasitical diseases	32·59	0·16	62·91	7·72	990·54	4·68
Brain and nerve diseases	5·27	0·23	9·22	10·65	954·31	43·80
Exterior ailments	54·31	0·69	95·25	31·65	984·17	12·002
Poisoning cases	0·06	0·01	0·12	0·91	713·33	285·71
Examinations	1·91	0·003	3·32	0·15	979·16	1·73
Intermittent fever	150·01	0·62	263·15	29·52	995·10	4·25
Catarrh of the digestive organs	76·90	6 78	134·67	312·93	907·50	87·99
Remittent fever	34·53	2·53	60·59	116·43	931·00	72·90
Other forms of typhus	13·03	2·86	22·85	132·26	771·09	216·77
Tubercular diseases	2·17	1·05	3·81	48·24	531·01	479·57
Inflammatory diseases of the internal organs	53·29	2·56	93·45	118·72	946·18	48·13
Syphilis	31·43	0·09	55·14	4·10	992·98	2·82

From this table it is seen that the *maximum* of sick and fatal cases falls under the head of pestilent diseases, and that intermittent fevers take the second place as regards the number of sick. The deaths of those under the same head were accounted for by diarrhœa. The greater portion of such fever cases was induced by marsh miasma.

Intermittent fever in Turkistán assumes an epidemic form, for cases of it are met with in all parts where Russian troops are quartered, and this without an exception although the stations are far apart. During the ten years from 1867 to 1876 inclusive, the *maximum* of intermittent fever cases at each station is arranged as follows :—

	Percentage of intermittent fever cases.		Percentage of intermittent fever cases.
Vairnoye	15·10	Fort Yangi-Kurgán	0·69
Táshkand	11·95	Sergiopol	0·65
Sámarkand	11·42	Fort No. 2	0·53
Tokmak	6·79	„ Julek	0·50
Chináz	6·71	„ Peter-Alexander	0·48
Jizák	5·71	Lepsinsk	0·43
Khojand	5·65	Námangán	0·36
Kázalinsk	4·41	Andiján	0·36
Kátta-Kurgán	3·77	Fort Ak-Su	0·34
Aulie-Ata	2·67	„ Merke	0·26
Kulja	2·67	Osh	0·22
Ura-Tapa	2·30	Fort Tarbogatai (Southern)	0·16
Kárakol	2·08	Margilán	0·09
Chimkand	1·50	Fort Makhrám	0·09
Fort Tilliau	1·49	„ Chár-Dara	0·08
Kopál	1·45	„ Muzárt	0·06
Khokand	1·22	„ Nukus	0·06
Fort Bakhti	0·94	„ Chust	0·05
„ Nárin	0·88	Urdjár station	0·04
„ Perovski	0·78	Fort Nau	0·02
„ Borohudzir	0·76	„ Gulcha	0·01
Turkistán	0·69	„ Kára-Tube	0·008

The deaths from intermittent fever at Kátta-Kurgán formed 14·43 *per cent.*; Jizák, 13·40 *per cent.*; Táshkand, 11·85 *per cent.*; Chináz, 11·34 *per cent.*; Vairnoye, 9·27 *per cent.*; Turkistán, 6·18 *per cent.*; Sámarkand, 5·67 *per cent.*; Peter-Alexander, 3·09 *per cent.*; Bakhti, 2·57 *per cent.*; Kulja, 2·57 *per cent.*; Fort No. 2, 2·57 *per cent.*; Aulie-Ata, 2·57 *per cent.*; Kárakol, 2·06 *per cent.*; Kázalinsk, 11·54 *per cent.*; Perovski, 1·54 *per cent.*; Yangi-Kurgán, 1·54 *per cent.*; Nárin, 1·54 *per cent.*; Khojand, 1·03 *per cent.*; Nukus, 1·03 *per cent.*; Borohudzir, 0·58 *per cent.*; Julek, 0·51 *per cent.*; Chimkand, 0·51 *per cent.*; Merke, 0·51 *per cent.*; Tokmak, 0·51 *per cent.*; Ura-Tapa, 0·51 *per cent.*; Osh, 0·51 *per cent.*

Note.—Looking to the fact that each of the stations above named has not been occupied by Russian troops for the same number of years, it is not possible to arrive at any positive deductions as to the comparative advantages in respect of the fewer number of intermittent fever cases of one station over another.

Of the epidemics amongst the troops of the Turkistán Military Circle during the ten years under review (1867—1876), remittent fever takes the first place.

This disease has been observed on five occasions, *i.e.*, during 1867, 1868, 1870, 1871, and 1874, but it was distinguished by the greatest intensity in 1867, 1868, and 1870. With the exception of the year 1871, in all the years quoted the remittent fever outbreaks were followed by epidemic and blotchy typhus. In 1875 and 1876 epidemics of bowel typhus occurred.

The mortality from remittent fever was, generally speaking, inconsiderable. It was only in the year 1868 that the number of deaths from this disease took the first place in the list of diseases, its rate of mortality being 19·01 *per mille* of the strength of the troops, and a fairly large number died of it in 1867 also, *viz.*, 7·38 *per mille.* In the same year typhus caused the greatest mortality.

None of these epidemics, however, have arisen within the limits of the Turkistán Military Circle, but have been introduced by troops coming to it from without, *i.e.*, from other commands and by parties of conscripts. Such epidemics have begun at Kázalinsk (the first point on the road between Orenburg and the Turkistán Military Circle). Thence they have spread throughout the country. At least such an origin was distinctly traced in the case of the epidemics of 1867 and 1868. In 1872 cholera, which raged for five months within the limits of the Turkistán Military Circle, was brought from the Khánate of Bukhára.

The virulence of this outbreak was not, however, identical in the several stations of the Turkistán Military Circle, as will be seen from the following table :—

Names of Stations.	Cholera cases.	Deaths from cholera.	Percentage of cases.	Percentage of deaths.	Duration of the epidemic.	*Per mille* OF STRENGTH.	
						Cases.	Deaths.
Táshkand . .	548	170	35·219	29·72	From $\frac{17\text{th}}{29\text{th}}$ June to $\frac{1\text{st}}{13\text{th}}$ August.	97	30
Khojand . .	197	33	12·660	5·76	From $\frac{20\text{th June}}{2\text{nd July}}$ to $\frac{1\text{st}}{13\text{th}}$ August.	130	21
Sámarkand . .	190	136	12·217	23·77	From $\frac{13\text{th}}{25\text{th}}$ June to $\frac{5\text{th}}{17\text{th}}$ August.	54	39

Names of Stations.	Cholera cases.	Deaths from cholera.	Percentage of cases.	Percentage of deaths.	Duration of the epidemic.	Per mille OF STRENGTH.	
						Cases.	Deaths.
Fort Kátta-Kurgán .	119	60	7·647	10·48	From $\frac{\text{15th}}{\text{27th}}$ June to $\frac{\text{1st}}{\text{13th}}$ August.	122	61
„ Ura-Tapa . .	112	19	7·204	3·22	From $\frac{\text{22nd May}}{\text{3rd June}}$ to $\frac{\text{6th}}{\text{18th}}$ July.	119	20
Perovski . .	94	22	6·041	3·84	From $\frac{\text{2nd}}{\text{14th}}$ July to $\frac{\text{17th}}{\text{29th}}$ August.	190	45
Fort Kára-Tapa .	70	45	4·498	7·86	Not known . .	35	22
Chináz . .	56	19	3·598	3·32	From $\frac{\text{15th}}{\text{27th}}$ June to $\frac{\text{3rd}}{\text{15th}}$ August.	64	21
Turkistán . .	56	16	3·341	2·79	From $\frac{\text{12th}}{\text{24th}}$ July to $\frac{\text{15th}}{\text{27th}}$ August.	123	35
Fort Kluchevoye(Jizák)	33	11	2·120	1·92	From 1st half of May to $\frac{\text{30th July}}{\text{11th Aug.}}$	165	55
Kázalinsk . .	33	15	2·120	2·32	From $\frac{\text{19th}}{\text{31st}}$ July to $\frac{\text{20th September.}}{\text{2nd October.}}$	15	7
Chimkand . .	26	11	1·670	1·92	From $\frac{\text{19th}}{\text{31st}}$ July to $\frac{\text{9th}}{\text{21st}}$ August.	31	13
Fort No. 2 . .	13	10	0·835	1·74	From $\frac{\text{23rd July}}{\text{4th August}}$ to $\frac{\text{22nd August.}}{\text{3rd September.}}$	53	40

Names of Stations.	Cholera cases.	Details from cholera.	Percentage of cases.	Percentage of deaths.	Duration of the epidemic.	*Per mille* OF STRENGTH.	
						Cases.	Deaths.
Fort Julek . .	7	4	0·449	0·69	From $\frac{9\text{th}}{21\text{st}}$ August to $\frac{16\text{th}}{28\text{th}}$ September.	20	11
„ Aulie-Ata . .	1	1	0·064	0·17	From $\frac{12\text{th}}{24\text{th}}$ July to $\frac{15\text{th}}{27\text{th}}$ August.	3	3
„ Tilliau . .	1	...	0·064	...	Not known . .	3	—

In order to get a clearer view of the state of health of the troops of the Turkistán Military Circle from the year of the formation of that Circle (1867) to the year 1876 inclusive, and likewise with the results of the treatment, &c., of the several cases, the following table will perhaps prove of use. In this table the cases of sickness and of mortality are grouped together, and a percentage on the strength of the troops is shown in each of the more important types of disease. The general total of sick and death cases are shown for each year separately.

		1867.	1868.	1869.
Per Mille OF STRENGTH—				
I.—Pestilent diseases	Cases	589·22	702·23	499·82
	Deaths	33·23	48·08	9·14
II.—Cachochymic and organic diseases.	Cases	44·97	47·25	38·66
	Deaths	5·22	4·34	2·44
III.—Contagious and parasitical diseases.	Cases	45·58	46·01	32·51
	Deaths	0·17	0·58	0·07
IV.—Brain and nerve diseases.	Cases	4·92	5·26	4·68
	Deaths	0·30	0·08	0·19
V.—External diseases	Cases	57·20	62·41	65·62
	Deaths	1·25	1·57	0·74
VI.—Intermittent fever	Cases	128·80	170·73	244·58
	Deaths	0·99	0·49	0·19
VII.—Catarrhs of the digestive organs, principally diarrhœa.	Cases	102·30	84·28	63·84
	Deaths	13·33	15·90	4·05
VIII.—Remittent fever	Cases	97·64	248·14	5·95
	Deaths	7·38	19·01	0·20
IX.—Ordinary forms of typhus.	Cases	35·52	32·26	6·93
	Deaths	7·85	9·31	1·37
X.—Tubercular diseases	Cases	50·89	3·93	2·40
	Deaths	2·93	1·90	0·90
XI. Inflammatory diseases of the internal organs.	Cases	49·29	40·75	60·49
	Deaths	3·10	2·36	2·04
XII.—Syphilis	Cases	42·30	41·37	24·20
	Deaths	0·08	0·41	—
Per Mille OF ADMISSIONS—				
1.—Pestilent diseases	Recoveries	792·31	891·21	777·23
	Deaths	827·06	880·21	725·00
2.—Cachochymic and organic diseases	Recoveries	61·12	54·65	60·11
	Deaths	129·96	79·60	193·75
3.—Contagious and parasitical diseases.	Recoveries	61·29	53·22	51·17
	Deaths	4·98	9·84	6·25
4.—Brain and nerve diseases	Recoveries	6·61	6·08	7·16
	Deaths	7·51	1·51	15·62
5.—External diseases	Recoveries	76·90	72·18	102·03
	Deaths	31·14	28·80	59·37
6.—Intermittent fever	Recoveries	172·56	149·54	341·95
	Deaths	24·70	9·09	15·06
7.—Catarrhs of the digestive organs, principally diarrhœa	Recoveries	137·62	97·48	99·27
	Deaths	331·90	291·12	321·87
8.—Remittent fever	Recoveries	131·29	286·98	9·25
	Deaths	183·67	347·99	18·75
9.—Ordinary forms of typhus	Recoveries	47·77	37·31	10·79
	Deaths	195·48	170·58	109·37
10.—Tubercular diseases	Recoveries	8·06	4·56	3·74
	Deaths	73·03	34·87	71·87
11.—Inflammatory diseases of the internal organs	Recoveries	66·93	47·17	94·06
	Deaths	77·34	43·21	162·05
12.—Syphilis	Recoveries	56·88	47·83	43·81
	Deaths	2·14	7·58	—

1870.	1871.	1872.	1873.	1874.	1875.	1876.
602·06	590·75	488·91	357·12	302·56	276·73	242·59
16·97	20·40	29·92	8·92	9·07	8·55	9·64
38·40	42·35	32·71	32·29	23·01	24·72	15·69
3·10	4·15	2·35	2·17	1·44	1·27	0·77
23·96	32·47	33·80	38·12	43·09	34·09	30·59
0·22	0·17	0·15	0·13	0·22	0·13	—
6·99	6·09	6·45	6·74	4·82	4·38	3·33
0·33	0·34	0·34	0·29	0·12	0·13	0·17
65·62	61·84	58·98	55·44	39·84	46·67	42·57
0·78	1·05	0·49	0·39	0·41	0·36	0·31
244·58	243·006	152·57	120·99	116·22	98·24	77·11
1·75	0·85	0·52	0·88	0·64	0·25	0·19
86·41	110·39	113·56	74·60	45·86	55·20	54·01
6·95	9·47	6·94	3·98	3·76	3·66	4·45
33·99	17·47	0·89	0·52	11·52	11·001	2·34
1·42	2·28	0·02	0·06	0·41	0·05	0·13
18·32	10·42	1·67	3·19	10·91	8·83	1·18
2·87	2·89	0·96	0·86	1·74	1·41	2·20
3·44	3·16	1·95	1·15	0·77	1·00	0·50
1·94	1·36	1·11	0·52	0·54	0·47	0·26
64·72	71·68	61·12	61·07	46·09	46·78	37·04
3·17	3·78	2·97	2·20	1·64	2·41	2·25
22·58	27·87	29·52	33·71	36·46	30·14	17·39
0·03	—	0·12	0·03	0·19	0·08	—
810·64	803·66	784·30	719·82	728·68	711·32	721·06
792·32	786·08	900·18	741·04	790·36	820·10	975·73
52·21	57·59	52·43	71·73	55·42	63·56	46·65
144·85	152·23	70·89	181·81	127·47	121·69	70·14
37·30	44·15	54·22	76·84	103·79	87·63	90·94
10·47	6·56	4·66	11·01	19·83	13·22	—
9·40	8·29	10·34	13·60	11·62	11·28	9·90
15·70	13·12	10·26	24·51	11·33	13·22	16·03
88·30	84·10	94·61	111·75	95·96	119·98	126·37
36·64	40·68	13·99	33·05	36·82	34·39	34·06
329·42	380·47	244·75	243·87	279·92	252·53	228·47
82·02	32·80	15·85	74·38	56·65	23·80	18·21
116·35	150·13	182·17	150·37	110·43	141·26	160·56
327·74	364·82	208·95	330·30	331·44	349·20	404·08
45·76	24·23	1·44	1·06	27·28	11·71	6·95
66·31	87·92	0·93	5·50	36·82	5·29	62·02
24·57	14·17	5·67	6·43	26·35	22·71	33·79
134·36	111·54	28·91	74·38	155·80	134·92	200·04
4·65	4·30	3·13	2·32	1·86	2·57	1·50
73·29	52·49	33·58	44·07	48·15	44·97	24·04
87·20	97·44	98·54	111·007	118·12	118·12	116·60
148·34	145·66	89·53	144·47	230·15	230·15	204·40
30·40	37·90	47·36	67·95	87·82	77·48	81·36
1·74	—	3·73	2·76	16·99	7·93	—

The above figures show that those diseases whose appearance mainly depends on local conditions in their widest sense, inclusive, *i.e.*, of climate, soil, and the relations between labour and rest, have since 1870 been gradually and surely decreasing amongst the troops of the Turkistán Military Circle. For instance, the number of cases of pestilent diseases and of intermittent fever in 1876 appear about one-third as compared with those of 1870. As regards the other diseases which are shown in groups and under separate heads, and also the mortality from them, although the same regularity is not noticeable, and although later years even present higher figures as compared with former years, nevertheless, generally speaking, a vast improvement in the health of the troops is revealed. And this because diseases of all kinds show for the second half of the period under review (1867 to 1876) a considerably lower rate notwithstanding the great increase to the numerical strength of the Russian troops and the greater widening of the limits of territory occupied, involving the occupation of not a few localities whose climatic and soil conditions are very unfavourable, causing increased sickness amongst the troops there located. This remark applies to Khokand, where, in 1876, 556 men were laid up with intermittent fever. Vairnoye and Táskhand, on the other hand, both of which were steadily at the top of the list in respect of such cases, showed during the same year only 236 and 235 fever cases respectively.

Measures taken to preserve the health of the troops of the Turkistán Military Circle.—To this end attention was principally directed to improvements in the soldiers' way of living. Thus more spacious and healthy barracks were constructed wherein the men could breathe a pure atmosphere. Their food, too, was improved. Each soldier was provided with his own plot of ground to cultivate, whilst an additional allowance was given him for improving the quality of his food and increasing the amount of his meat ration.

In order to raise the general standard of the health of the troops and thereby to enable the organism of the soldier to withstand all kinds of sickness-inducing influences, the following orders were issued: No. 104 of $\frac{16}{28}$th April 1869, and No. 428 of $\frac{16}{28}$th December 1870, the purport of which was as follows:—

During the hot season, in order to reduce the sultriness and to remove the hurtful influence of dust on the eyes and lungs of the soldier, the barracks and camps were to be watered and the tents to be sprinkled daily. Soldiers were forbidden to stand in the sun even for a short time with uncovered head. Shirts of a looser description and with wider openings were to be worn. Sentries were to be posted in the shade, and where this was not possible, screens of a mushroom shape made of reeds were to be provided as a protection from the heat. Reliefs were to be more frequent, especially about midday.

From 10 A.M. to 4 P.M., work of all kinds in the open air was to be discontinued, exceptions being made in cases of special importance. The same rule was to apply to troops on the march. Bathing twice a day was recommended, *viz.*, in the morning two hours after sunrise and in the evening one hour before sunset, when the head, face, neck and arms were to be well bathed. At midday, in order to increase the strength, a little sleep was to be permitted.

During the Khivan Campaign of 1873 measures were adopted for the preservation of the health of the troops both on the forward and return marches and during the occupation of the Khánate. These measures took the form of a steady issue both of groats and biscuits, and of one pound of meat per man, with an allowance of tea and sugar. Issue of spirit was absolutely forbidden. The troops were furnished, too, with *kibitkas* and portable tents (*tentes d'abri*), and with felts on which to lie at night.

The strictest cleanliness in camp and around was observed. When a halt was to be made for more than 24 hours, tents were to be struck the second day. Pits for latrine purposes and for the reception of the refuse of the slaughter-yard were to be dug far away from the camp. These pits were to be covered daily with a layer of dry earth 1 foot thick.

During the stay of the Russian troops in the Khivan Khánate, and likewise whilst they were on the march to and from the country, the ordinary allowance of meat was increased. The troops, too, received a daily ration of tea and sugar. In place of biscuits either bread was issued or 2 lbs. of flour per man *per diem*.

Attention was paid to the regular supply of water throughout the camp. With this object special and separate places were set apart for water used in cooking, drinking, bathing, and washing; also for the washing of clothes, camp vessels, and the watering of the horses and camels.

A special committee was appointed to superintend the carrying out of the rules regarding the water-supply. Every kind of impurity was to be at once removed from the camp and buried in the earth. The supervision over the tidiness of the camp and adjoining ground was most careful and strict. For latrine purposes digs were dug far away from camp and as deep as possible, provided that the bottom did not reach the level of the water line.

In like manner special places were set apart for the slaughter of cattle, and for the reception of blood and offal, &c., pits were dug and immediately filled in. The result of all these measures was that the soldiers were kept clean and tidy. The neighbourhood of the tents, footpaths, places of gathering, were daily flooded so as to prevent any very great amount of dust.

Bearing in mind that the troops of the Turkistán Military Circle principally suffered from epidemics that had been brought and spread by the several detachments and parties of conscripts, special attention was devoted to this fact, and in conjunction with the commandants of the several districts, measures were worked out for the better sanitary state of such new arrivals. The medical officers in charge of these parties had represented, as the cause of sickness of every kind, insufficient and bad food, indifferent clothing, great fatigue from long marches,—marches that were performed when the soldiers were not acclimatised or accustomed to the fierce heat of the steppe at the hottest time of the day. It was further represented that the jaded state of the conscripts was due to their transport over the rivers of Western Siberia on rafts, and to the utterly unfit barrack accommodation set apart for them at Semipálatinsk. Measures were then directed against all the unfavourable conditions which had been brought to notice. In 1871 instructions were issued to the commanders of parties of conscripts setting out on service in the Turkistán Military Circle. These instructions were framed with the object of preserving, as far as possible, the health and strength of the young soldiers for whose marches on the steppe special rules were laid down[1] with respect to their halts, victualling, precautions on the road, with regard to local conditions, also in what manner the commanders of such parties were to undeviatingly manage them from the date of setting out to the day of disbandment. The seeing to the carrying out of the rules in question was part of the duty of the military heads of provinces. Staff officers were therefore appointed by them for the purpose and sent to the distant parts of their several commands. With regard to the improving of the transport of the conscripts along the rivers of Western Siberia and of their barrack accommodation at Semipálatinsk, the arrangements were, by an order of 1876, placed in the hands of each local official. Unremitting care was exercised with regard to the equipment of each party with a proper medical establishment, drugs and bandages, as also concerning the proper victualling of the men composing it. With these objects it was proposed to give hot food twice in the 24 hours, to allow one pound of meat per man, to issue biscuits of a thoroughly good quality, and to make it possible to everywhere procure a supply of good water. In place of *vódka,* tea was to be issued every morning. Each party was to be furnished with a sufficiency of carriage for the sick and foot-sore and for the women and children[2]. For halting-places, only spots that were open, dry, and supplied, as as far as possible, with running water, were to be selected. At such spots *yúrtas* were to be pitched, care being taken that each successive party did not encamp where the preceding one had been, but on a completely fresh place. Each member of the party was to be furnished with a sufficient quantity of felt for bedding. Orders were to be sent to every town on the road for the marching parties to be examined by the local medical officers, so that any one showing signs of sickness was to be detained and placed under medical treatment. When a party arrived at its destination, the barrack accommodation was to be allotted so as to allow plenty of room, especial attention being paid to the regard of tidiness and purity of air. To this end the barracks were to be cleared daily and thoroughly aired, and subjected to such other measures as are in constant sanitary practice.

During the last two years, thanks to all the wise measures above detailed, the necesssity for seeking out any special sanitary appliances has not arisen. The attention and care of both the Military and Medical officials have, therefore, been directed to improving the, so to speak, domestic life of the soldier. With this object his life in barracks has been closely observed, so that, *1st,* he should constantly breathe renewed air, free from all organic and inorganic admixtures. To this end it has been proposed to allow greater barrack space to each soldier, taking care that each man should have an air passage (calculated according to the space taken up both by the inmates of the barrack and their belongings) of not less than 1½ cubic *sajens* (=514½ cubic feet). Special attention was also given to the construction of new barracks or the rebuilding of old ones; to the maintenance of regular communication between the outer air and that of the barracks by the constant opening of ventilators, windows, and doors; to the preservation of the greatest cleanliness in barracks, so that when the floors, whether of stone or earth, were swept, they should be sprinkled over with water in order to avoid as much dust as possible. No surplus articles, especially those not in actual use, to be allowed to be kept in barracks, such as Cossack saddles, saddle-cloths, and other articles of horse equipment. The rank and file to be compelled at least once a week to remove everything from the barracks, especially their bedding, which was to be carefully shaken and aired; the cleansing of clothes, cleaning of boots or of fire-arms in barracks to be strictly forbidden. During the winter all the soldiers to be ordered away from their barracks for several hours daily for some kind of inspection by the commandant. During their absence the barracks to be subjected to all possible airing by the simultaneous opening of all windows and doors. Route marching to be carried out as far as possible. On the appearance of any sickness in the barracks, especially such as might assume an epidemic form, all the ailing men and any predisposed to disease to be at once segregated from the sound soldiers, and placed under medical observation. With regard to the healthy soldiers, every endeavour was to be made to apply increased measures to insure their well-being, other than those enumerated above.

---

[1] At first parties of young soldiers were sent by route march to the Turkistán Military Circle by the Orenburgh-Kazála tract exclusively, but more recently the greater number were sent through Western Siberia, wherein most of their route was by river transport.—*Author.*

[2] Of late, parties of conscripts have been transported to the limits of the Turkistán Military Circle either on carts or on camels.—*Author.*

2nd.—In order to prevent, as far as possible, several soldiers occupying the same bedstead, every endeavour was to be made to supply each man with separate bed and bedding, care being taken that there should be free approach on three sides at least, if not on all.

3rd.—In order that the men might receive proper protection from cold and damp during the autumn and winter, a thorough uniformity was to be observed in the construction of stoves, ceilings, ventilators, entrance doors and corridors, care being taken that all worked in the same manner.

4th.—In order to maintain constant cleanliness of body, visits to the baths weekly were made compulsory upon all, whilst in summer bathing was to be frequently carried out.

5th.—In order that the soldiers' rations might be of the best possible quality, careful supervision over every article was to be made, and this care was to be extended to the drinking-water. In cases of extra work or of any perceptible weakness on the part of the men, or of predisposition to sickness, an extra meat ration was to be at once given. The issue of spirit was to be finally discontinued and exchanged for a daily issue of tea. Moderation in the consumption of fruit was to be exercised and particular care given to its selection.

6th.—The work of the soldiers was not to be excessive and the rest allowed was to be proportionate. With this object, during the summer months all necessary instruction of the men and state work were, if possible, to be confined to the early morning or to the afternoon. The soldier was to be exempted, as far as possible, from such calls during the hottest time of the day. Sentries in the open were to to relieved frequently, and when they were posted in such places, small screens were to be erected over them.

7th.—To have latrines of the best kind constructed, and such as could exercise no bad influence on the health of the soldier, either indirectly by the generation of noxious gases, or directly by the pollution of the soil and water. Unfortunately the smallest results in this respect have as yet been attained. The construction of latrines is almost| everywhere of the most primitive kind—mere pits, whence are diffused during the summer season the most fearful smells. Consequently such latrines had to be put in places far away from the soldiers' barracks, in spite of the fact that the distance was of itself a great inconvenience. Prohibition was also given to the excavation of wells near such pits and to the leading of water ducts for irrigation purposes in their neighbourhood. These latrines had moreover to be daily disinfected by sprinkling them over with dry sifted earth in layers of about a foot thick.

In order that all the above-indicated measures for the preservation of the health of the troops might give as good results as possible, and lest, in the carrying of them out, the soldiers might regard them as purely formal and without any real meaning, the doctors, by means of lectures, &c., in the battalion schools, strove to make the rank and file acquainted with the principal requirements of hygiene, and with the vast importance of the most accurate fulfilment of these essentials. They at the same time applied themselves to the task intelligently and zealously, endeavouring, at the same time, to carry out all the sanitary regulations laid down with the greatest exactitude.

It may be confidently asserted, then, that all the above-indicated exertions to improve the sanitary condition of the life of the Turkistán troops will not remain barren of results. Nay, even now the health of those troops is very satisfactory, and in no way yields to that of the Russian army within European limits[1].

CHAPTER V.

INTELLECTUAL AND MORAL DEVELOPMENT OF THE TURKISTAN TROOPS.

Causes that unfavourably influence the intellectual and moral development of the Turkistán soldier—Measures adopted for raising that standard—Corps of officers: training of officers—Libraries—Courts of honour—Education amongst the Turkistán troops—Morals of the lower ranks—Effect of taverns—Discipline—Number of men punished—Number of deserters and causes of desertion—Spirit of the Turkistán soldier.

In the early days of the Russian occupation of Turkistán many causes served to exercise a very unfavourable influence upon the intellectual and moral development of the Turkistán troops. The scattered character of their distribution, their severance from European life, their entirely strange life and surroundings—experiences which engendered a longing for their Father-land, the burden of their service, the want of female society, &c., &c., operated prejudicially on both the officer and private soldier of the Russian army of Turkistán.

As soon as the Turkistán Military Circle was established, General

---

[1] Which is not, perhaps, saying very much.—*Trans.*

Aide-de-Camp Von Kaufmann, who was appointed to the command, occupied himself, immediately on his arrival in the country, with the examination of the question as to the raising of the moral and intellectual standard of the troops placed under his orders. To this end he convened a special committee, which, after an attentive examination of the matter, found it necessary to propose the following measures:—

1. The formation of local libraries in all the district towns, so that the several detachments that were constantly being relieved might have material for reading. Accordingly, in 1868, the Governor-General of Turkistán allotted the sum of 500 *roubles* (£62-10-0) for the purpose to each district town, the total sum set apart being 6,000 *roubles* (£750).

2. The building of military clubs at all the principal stations. In the same year (1868), therefore, clubs were started at Táshkand and Vairnoye, and two years later at Sámarkand.

3. Assistance to both officers and men to bring their families to Turkistán, so as to give the unmarried the opportunity of passing their time in the society of their married companions.

On the recommendation of General Von Kaufmann, the wives of the private soldiers were, from the year 1869, sent to the county, and there by degrees raised the proportion of females to males in the country.

4. The encouragement of sport as much as possible, in order that the rank and file might also take part in it. In order, too, that the beasts of prey (tigers, &c.,) might be eradicated, prizes on the following scale were offered: first tiger 25 *roubles* (£3-2-6), second tiger 30 *roubles* (£3-15), and so on. In such tiger-infested localities as the southern portion of Semiraitchia, Chináz, Fort No. 2, Perovski and Julek, tiger-shooting was much resorted to, and in many instances the same man would receive several rewards.

5. The formation of a racing club at Táshkand. This club was started in 1868, and existed for several years. It did much to develop bold riding amongst the Cossacks, and towards securing a good class of horse for the officers.

Thanks to the adoption of the above propositions, the moral and intellectual condition of the Russian army of Turkistán has improved from year to year.

At the present time the officers of Artillery, of the Sapper ½ battalion, and of the Rifle Brigade, in respect of moral and intellectual tone, leave nothing better to be desired. All of the two first categories and 61 per cent. of the third have received their education in special seminaries.

In the Turkistán Line Battalions, in the three Local Battalions in the district and native levies, the percentage of officers, who have completed a course at the universities, military schools, former cadet corps, and gymnasia, is much less. Still, even this percentage comprises more than one-third of the total number of officers. The remainder have received their education either in schools of the third category or at home. Officers of the first category, *viz.*, those who have received the best military and general education, are for the most part employed in superintending the interior economy of battalions in the capacity of adjutants, paymasters, quartermasters, and instructors.

In many respects Cossack officers are inferior to those of the Line;

and this fact is explained by the peculiar character of their life and surroundings. But of late amongst them, too, a great improvement has been observed, especially in the case of the Orenburgh Cossack forces.

A taste for literature is gradually developing amongst the officers, as witnessed by the circumstance that many new publications and journals are added to the local libraries year by year. The money allowed by the State, in conformity with Military Department Order No. 8 of $\frac{6\text{th}}{18\text{th}}$ January 1873, has done much to assist in the circulation of books in battalion libraries.

Independently of receiving books from the battalion and staff libraries, very many officers order books and journals out on their own account.

The best libraries are those of the Artillery and Rifle Brigade; then follow those of the 3rd, 5th, 9th, and 14th Turkistán Line Battalions. The libraries of the troops serving in the Semiraitchensk province are in the worst condition, and this is because those troops are so much scattered as not to be able to maintain good battalion libraries. It is noticed that in all the libraries of Turkistán light literature predominates, the section for military works being in a very unsatisfactory condition.

In the head-quarter staff, or, so to speak, the central, library, there are, besides books and journals on general subjects, a fairly large number of military works and special journals in the Russian, French, German, and English languages.

In the Local and Cossack contingents libraries have not yet been started, because of the small number of officers with those arms and the insufficiency of their pay and allowances. These officers can, however, avail themselves of books from the district libraries, which are maintained, as stated above, by sums assigned by the Governor-General.

The moral standard of the officers of the Russian army of Turkistán is a fairly high one. Officers' courts have scarcely ever to be held in the Artillery, Engineers', or Rifle Brigade.

In the Line Battalions of Turkistán, however, such tribunals were convened eight times in 1877, but only once in 1878.

The delinquencies, which occasioned the assembly of a court of honour composed of the offenders' comrades, consisted of broils, insulting brother officers, improper conduct, and other official offences. The awards of such courts necessitated on the part of the offenders the submission of their resignation, or the removal to other branches of the service, or the subjection to the bad opinion of their brother officers.

Let us now pass to a consideration of the moral and intellectual progress of the lower ranks.

In proportion as Russian rule became established in the newly-acquired country, and when the moving about of the several arms of the service was of less frequent occurrence, and consequently when it was found possible to devote more time to instruction in reading and writing, education became more and more established amongst the troops of Turkistán. But, of course, this progress was not uniform in the several branches of the army.

The highest place, in point of education, is held by the Sapper ½ battalion (93 per cent. of the strength of which can read and write);

next comes the Field Artillery with a percentage of 76·5, then the Rifle Brigade with 65·3.

In the Line and Local Battalions, and likewise in the District and Local levies, the percentage of those who can read and write is 47.

Amongst the number of prime causes which have unfavourably influenced the development of reading and writing amongst the troops of the Turkistán Military Circle, is the difficulty of providing teachers and appliances for the various detachments scattered in small bodies over a vast territory.

In consequence of the insufficient number of officers present with a battalion, the instruction in reading and writing is to some extent entrusted to sub-lieutenant and non-commissioned officers, persons of insufficient experience in scholastic affairs.

In a moral aspect the condition of the rank and file of the Russian army of Turkistán is very satisfactory.

The least satisfactory in this respect are the local troops, especially the levies and the irregular forces.

The cause of this lies in their lower standard of *morale*, in the character of their service, and in the selection of the men.

As regards the Cossacks, their relatively low standard of *morale* is the result of their condition of life and the short time which they have to pass in service with the colours.

With respect to the causes which have the most pernicious influence on the moral condition of the whole army of Turkistán, incontestably the chief is the hankering after alcohol—a craving which has mastered the private soldier whilst still in his own land.

Drunkenness is the mother of crime amongst the troops of the Russian army of Turkistán, and the bulk of the crimes and offences are committed by the men when under the influence of drink.

In the Khivan Expedition when the issue of all spirit to the troops of the operating arm was unconditionally forbidden, and a daily ration of tea was issued to them instead, the moral condition of the rank and file left nothing better to be desired; for not only there were no crimes, but there was an almost entire absence of minor offences. After such experiences during the campaign just named, and during the Khokand campaign of 1876, the Turkistán authorities resolved to discontinue the issue of spirit and to introduce in lieu a ration of tea.

In order, too, to prevent the spread of drunkenness amongst the men, the local authorities are establishing "tea taverns" at every military station where the men may pass their leisure time. The same thing has been successfully done in European Russia.

The discipline of the Turkistán troops is improving with each year. There have been no serious breaches of late years.

Less serious cases of indiscipline have occurred more frequently amongst the local and irregular troops, and particularly amongst the latter, in consequence of the incompletely established relations between the officers and their subordinates.

The most prevalent crimes calling for disciplinary punishment are drunkenness, petty theft, absence without leave, brawling; and amongst the irregular troops, negligence in the performance of escort and sentry duties.

The total number of men of the Turkistán army who were punished in 1878 was 388, or 0·7 per cent. of the average effective strength. These punishments were principally confined to the *locataires* (billetted men), who, as a rule, exercised a very bad moral influence on the other private soldiers. Their punishments amounted to one-third of the whole.

The number of deserters from the Turkistán army in 1878 was 29 (or 0·05 per cent.). Of these, 18 were re-captured.

The causes of the diminution of the number of deserters must be sought in the improvement of the *morale* of the men, and in the difficulty which deserters experience in finding an asylum in the neighbouring countries, the rulers of which, as a general custom, make such men over to the Russian authorities. The majority of such deserters are Muhammadans. These men cherish the hope of finding amongst their co-religionists beyond the limits of Turkistán a more attractive kind of life.

The spirit of the Russian infantry of Turkistán is excellent. An unbroken series of honourable and brilliant victories has served to strengthen in the soldier the consciousness of his own invincibility and a thorough contempt for his foe. He regards the native of Central Asia not in the light of a man, but as some sort of animal, which, instead of a soul, is possessed of a vapour. The Turkistán soldier dubs the natives "a cursed horde and unmitigated blockheads," and by other and not less contemptuous epithets. It is to be understood that this scornful attitude of the Turkistán soldier towards the natives of Central Asia, although there may be no real reason for it, is to some extent justified by the circumstance that the natives on their side are prone to call the Russians by such despised names as *Káfir* (unbeliever), *Giaur* (dog).

The superiority of the Turkistán infantry soldier over the native warrior consists in this: he never loses his head, no matter how difficult may be the circumstances in which he may be placed Neither the number nor the unexpected appearance of his enemies troubles him. He is always confident of his own invincibility, whilst cowardice is unknown to him. The Russian soldiers of Turkistán live only in the hope of crossing swords with the foe. During the Khivan campaign of 1873, after the difficult march of the Turkistán detachment from Khal-Ata to the Oxus, there were only 50 weak and sickly men; but no sooner did it become known on the arrival of the detachment at Uch-Uchák that the enemy was awaiting it with the object of giving battle, than all the sick and weakly men left the camp hospital and rejoined the ranks, burning with the desire to share in the engagement.

The infantry soldier of Turkistán is perfectly satisfied with his lot, and in the majority of cases preserves his good humour, wittiness, gaiety, love of mischief, and devil-may-care disposition.

The qualities which exist generally in the soldier of European Russia are present also in his *confrère* of Turkistán, with this difference only that such qualities being intensified by the practice of war are, if possible, more sharply defined. Such qualities are complete and unchangeable devotion to his duty and to his oath, sacred service to his Tsar and Fatherland, resignation in the endurance of all possible privations, stoicism before the enemy, and magnanimity to those whom he subdues. The Russian soldier has long since gained for himself a reputation as being one of the best marchers in the world; but in Turkistán this renown has been much increased. It is, indeed, necessary to see for one's self to understand the difficulties which the Turkistán soldier has to face during a campaign. He has to penetrate into the depths of boundless and comfortless wastes, intersected by high sand heaps (*barkháns*), into which a horse will often sink up to its knee. The Turkistán soldier has to march across such a waste with his full quantity of ammunition, under a stifling and scorching sultriness, accomplishing a march of 40 *versts* (26⅔ miles) so as to reach water the sooner. By nightfall, indeed, he cannot always find it; and if he does so, it is often of a repulsive description. He has, moreover, often to content himself with a few biscuits steeped in stinking or brackish water. Nevertheless his courage forsakes him not for a moment. In his leisure hours, on the march or in camp, the Turkistán soldier enlivens his mind with songs in which he speaks of his campaigns, recalling to mind spirited and brave deeds and the names of those of his leaders and commanders who have conducted him to victory. The greater portion of such songs were, in truth, composed in the Caucasus, but they are altered so as to conform with the soldier's new surroundings and with the names of his fresher heroes.

In spite, then, of the heavy conditions of the life and service of Turkistán, this country presents also to our soldiers a brighter side: 1stly, the conviction of superiority over the races all around; 2ndly, the care and solicitude with which, from year to year, the authorities strive to improve his surroundings; 3rdly, the presentation of the possibility to men of enterprise to amass a little money. The greater portion of the house-owners in the towns of Turkistán are Russian soldiers. For the artizan and for the active man generally, provided he does not drink, there is no place where one can become rich so easily and quickly as in Turkistán. This is the reason why so many Russian soldiers remain in the country on the completion of their period of service with the colours.

The following are the figures representing the men on indefinite leave and on the Retired List who have remained in Turkistán :—[1]

	Sir-Daria Province.	Semiraitcheusk Province.	TOTAL.
1st—13th January 1969 . .	413	109	522
,, ,, 1870 . .	408	341	749
,, ,, 1871 . .	400	463	863
,, ,, 1872 . .	552	218	770
,, ,, 1873 . .	791	639	1,430
,, ,, 1874 . .	718	685	1,603
,, ,, 1875 . .	1.020	836	1,856
,, ,, 1876 . .	940	564	1,504
,, ,, 1877 . .	751	603	1,354
,, ,, 1878 . .	815	598	1,413

The men who have remained in the country are engaged in trade as artizans, petty traders, officers' or civil officials' servants, valets, cooks, coachmen, &c., and are in receipt of pay varying from 20 to 25 *roubles per mensem* (from £2-10 to £3-2-6).

---

[1] I have elsewhere drawn attention to the yearly increasing number of Russia's *Military* Colonists in Central Asia, a force which must be reckoned in computing the effective strength of this Power in her advances towards India.—*Trans.*

CHAPTER VI.

SERVICE AND OCCUPATION OF THE TURKISTAN TROOPS.

Sentry duty—Escorts—Imperial and Government works—Voluntary labour—Movement of troops, (*a*) in relief, (*b*) marching of detachments, (*c*) change of quarters, (*d*) movements under canvas.

In ordinary times of peace when there are no military operations or movements going on, the service and occupation of the Turkistán troops are included under the following heads:—

1. *Sentry duty.*—The daily sentry roster of the Turkistán military Circle comprises 573 posts. Generally speaking, this roster increases from year to year, and this increase is necessitated chiefly by the unsatisfactory state of the guard-rooms, for which extra posts are required in order to prevent the escape of prisoners.

2. *Prisoners' escorts.*—This kind of duty usually devolves upon the Cossacks. The absence of *étappen* buildings along the routes by which prisoners march, the unsatisfactory state of the guard-rooms, and to some extent the insufficient acquaintance of the Cossacks with the regulations of escort duty, have been the causes of the frequent escape of prisoners. But with every year this duty has been performed in a stricter manner, so that in 1878 the number of instances in which prisoners escaped was only two.

3. *Imperial and Government works.*—To these kinds of works belong the construction of roads through gorges so as to open out practicable routes to the Russian frontiers (for instance, roads over the Tián-Shán to the Káshgárian border line), the construction of high roads and of bridges, the erection of new forts, the repairing of the ramparts of such as exist, and the shaping of their profiles in a proper manner. Such labour has been going on, upon an extensive scale, at the chief military centres—Táshkand, Sámarkand, Margilán, and Vairnoye. All such works have chiefly devolved upon the troops owing to the insufficiency and costliness of native labour. In former years engineering works, especially in the Sir-Daria province, occupied the troops all the summer and not infrequently late into the autumn, *i.e.*, during the best season of the year. They, in fact, served as the chief obstacle to the regular and rational carrying on of their military training and manœuvres. Of late years, too, the Turkistán troops have had to erect their own barracks.

4. *Voluntary works.*—By Turkistán Government Order No. 54 of the $\frac{\text{23rd February}}{\text{7th March}}$ 1870, soldiers are permitted to give their labour for hire. By the terms of the order quoted, such work is to be carried out in parties or singly, and to be under the supervision of some officer during leisure hours. Artizans and soldiers, not being in the first category of service, are, however, allowed to undertake work all the year round.

Stoppages are only made for the benefit of the mess fund from the sums earned by voluntary labour in the following cases, and with the consent of the commandant of the forces in the particular province,—

(1) if the company mess fund has a capital less than 500 *roubles* (£62-10);
(2) if the reserve capital is under 500 *roubles* (£62-10) and
(3) if in consequence of the high market rates and their effect on

the several products or other unfavourable conditions, the ordinary subscriptions are insufficient.

In no case, however, does the amount of the stoppage exceed one-third of the money earned. The remaining two-thirds are divided amongst the men in proportion to the share of each in the work. The sharing is checked by those in charge of the company mess fund, and is approved by the commanding officer. Thus, two-thirds of the money earned pass in full into the hands of the men who have shared in the work, with the exception of a trifle for those on duty, who have been unable, through the exigencies of the service, to participate in it.

The voluntary labour of artizans, who have no company mess fund, is subject to the same rules of stoppage as obtain for the rank and file. But in the case of those artizans who have company messes, one-third of the earnings goes to the fund and to providing and repairing tools, whilst the remaining two-thirds are paid over in full to the artizans.

As regards the soldiers hiring themselves out on these voluntary works, it may be said generally that Turkistán, in consequence of its relative sparseness of population over the greater part of its area, and the limited extent of its agricultural industry, offers very few advantages to ordinary labourers, and consequently whole detachments of troops never obtain therein, as in European Russia, any opportunities of engaging in voluntary work. It is only the artizan who finds plenty to do in Turkistán.

5. *Movements of Troops.*—Such movements in Turkistán take place with various objects :

(*a*) *In relief.*—These reliefs occur the more frequently amongst the Cossacks. According to the regulations half of the Cossack troops are relieved yearly, and such relief takes place by ½ *sotnias.* A proportion corresponding to the number of new arrivals is sent on furlough. Besides the relieving ½ *sotnias,* detachments of recruits to complete the establishment arrive each year in the Turkistán Military Circle, whilst the reservists and time-expired men, with their families, are sent to their homes, *or, more probably, are induced to settle in the country*[1].

(*b*) *Formation of new frontier detachments in case of need, or the strengthening of those already in existence.*

(*c*) *Patrolling of the border country and the driving off of raiders.*—Such movements were formerly of frequent occurrence, and went on principally in the direction between the low lands of the Sir-Daria and the Kizil-Kum steppe, upon which Khivan raiders made their inroads and along the northern frontier of the Khánate of Bukhára.

(*d*) *Changes of the quarters* of such troops as have been on detached duty for a long period. Companies of infantry and divisions of artillery are frequently hundreds of miles away from their respective head-quarters, whilst in such remote parts their military training falls off and hence they have to be relieved by other detachments.

(*e*) *Camps.*—The Turkistán troops usually go out into camp on the $\frac{1\text{st}}{13\text{th}}$ May of each year (in Semiraitchia, the date fixed is the middle of June O. S.). They return to barracks in September. The greater number are collected in camp at Táshkand, Margilán, and Vairnoye.

---

[1] This is a most important fact in connection with Russia's hold on Central Asia.—*Trans.*

While under canvas the troops are exercised in combined drills and manœuvres. These exercises are even sometimes continued after the return of the troops from camp throughout October and November, since these months throughout the greater part of Turkistán are especially favourable to such exercises on account of the absence of a high temperature.

All the foregoing movements of troops go on in summer, spring, and autumn. In winter (*i.e.*, from the middle of November to the end of March, O. S.), in consequence of cold and the want of buildings at the several halting-places and the waste nature of the greater part of Turkistán, no movements are made except on rare and urgent occasions.

CHAPTER VII.

MILITARY MANŒUVRES.

Conditions for the development of the military training of the Turkistán troops: drill, target practice, gymnastics, fencing—Instructional Companies.

A constant state of preparedness for war cannot but develop and strengthen the military spirit and efficiency of troops. Besides frequent expeditions, the Turkistán forces, as stated in the preceding chapter, are constantly carrying out movements for military purposes in time of peace, whilst a series of unbroken triumphs has served to strengthen in the Turkistán soldier the assurance of his own power. Hence, as a fighting material, no fault can be found with him. Campaigns constitute his best school.

But, in order that the troops in Turkistán may be kept up to the level of contemporary tactical requirements, they receive, in time of peace, the same training as the forces of European Russia. Of course, as the Turkistán soldier is frequently taken away by other occupations incidental to the conditions of his service in a distant land (such as government and cordon works, preservation of his frontiers, &c.), he cannot devote so much time to all the branches of military training as his comrade in arms in European Russia is in a position to do. Still, in spite of these unfavourable circumstances, justice demands the acknowledgment that the Turkistán troops—at least the majority of them—zealously labour to perfect their military training; and their efforts to this end, especially of late, have led to successful results.

The inspections by the Commander-in-Chief and by the commanders of provinces show that the bulk of the Turkistán troops have on parade a sprightly and active appearance, and that all their manœuvres and evolutions are well carried out.

Of the infantry branch, the Turkistán Rifle Brigade presents the best front, whilst the local levies may be classed as the worst.

The drills of the two Turkistán Artillery Brigades are conducted with very great success, especially those of the batteries of No. 1 Brigade. But the same cannot be said of the companies of fortress artillery, which are scattered about in small parties all over the forts and fortified posts of the country, and which, through a paucity of officers, are often under the orders of non-commissioned officers. At the head-quarters, too, of such fortress artillery companies, there is, as a rule, but a very small number of men, and these are always employed on duties in the artillery magazines.

The Cossacks, as regards parade work, are somewhat weaker than the other arms. This fact arises from the unfavourable conditions of Cossack service,—conditions which very seldom permit of the bringing together of complete *sotnias*.

The Rifle Battalions are at the head of the Turkistán infantry as regards target practice, their figure of merit being above "excellent."

Of the Turkistán Line Battalions, the 12th showed the best results in 1878, its practice at all ranges save one being above "excellent."

The target practice of the local levies was not so good, still it was "satisfactory."

After the Cossacks had been furnished with their new rifle, their practice, too, met with considerable success.

As regards gymnastics, the Turkistán troops are under very favourable conditions. Their constant state of preparedness for war, coupled with the necessity for surmounting all possible obstacles, aid in developing the physical strength of the Turkistán soldier. Moreover, he takes very readily to gymnastic exercises. These exercises lead to the establishment of gymnastic clubs in almost all the regiments and batteries and *sotnias*.

The establishment of such things amongst the Cossacks, in consequence of their frequent changes of quarters, is a difficult matter. Hence gymnastics amongst them are not so successfully carried out, but their young and active representatives give skilful displays of their own special *jigitovka* and *voltijirovániye* (*i.e.*, performances on horseback of various kinds).

Amongst the Turkistán troops fencing is at a mcuh lower stage of development than gymnastics. The impossibility of carrying on fencing during the winter, because of the want of *manéges* and the insufficiency of barrack accommodation as well as of competent instructors and the limited supply of fuel, &c., are the causes for the necessary limitation of fencing amongst the Turkistán troops to the execution of the barest elementary rules. But in proportion as the above deficiencies are made good, it may be hoped that fencing in all its branches may be carried out more completely than is the case at present. The instructional corps do not a little to develop the several branches of military training in the case of the Turkistán troops; for they furnish non-commissioned officers of good education, and these men, being drafted to the several companies, convey to their comrades the benefits which they themselves have derived by instruction.

The instructional corps with the best organisation have been found to exist in the Rifle Battalions, the 3rd West Siberian, and the 4th and 13th Turkistán Line Battalions, and in the Vairnoye Local Battalion. Amongst the Cossack regiments the best instructional command was in the 1st Semiraitchensk Cossack regiment.

CHAPTER VIII.

CAMPAIGNING OF THE TURKISTAN TROOPS (WITH SKETCHES).

Peculiarities of warfare in Central Asia—Order of march—Sketch of normal order of march—Changes which would have to be made in it according to circumstances—Size of marching front and periods of march—Distribution at halting-places—Waggon barricades—Bivouacs—Sketch of normal bivouaking order and changes which would have to be made in it according to circumstances—Defence of transport, &c.

The mode of conducting war in Central Asia is very different from that which obtains in Europe. In the former case, nearly all the supplies of food, forage, ammunition, &c., required for the particular campaign, have to be carried with the detachment, as, in consequence of the waste nature of the districts, it is impossible to calculate on obtaining many of the necessaries by means of requisitions. The longer the campaign is likely to be, the greater the quantity of stores to be carried. This necessity entails an increase to the carrying power of the force, or, in other words, to its transport train.

The trains accompanying Central Asian detachments are of such proportions that the latter form, so to speak, the escort. The order of march of a Turkistán detachment conforms to the order observed in the case of a baggage-guard. One of the chief cares of such a detachment consists in protecting its transport train, the fall of which into the enemy's hands would place the troops in a very critical position. Hence it is that the movement of Russia's Central Asian forces within the sphere of hostile operations must be mainly guided by the rules that are observed by baggage-guards. Since an Asiatic enemy nearly always attacks from all sides, taking a detachment in front, flank and rear, the distribution of the troops on a march must be such that they may be able to repulse the enemy, no matter where he may appear.

In military operations in Central Asia there is no necessity for an advanced guard, such as is sent forward half a day's march in the case of European theatres of war. In the country of which we are now speaking, it is quite sufficient to throw out in advance at a distance of 1 or 2 *versts* (⅔rds to 1⅓rd miles) from the main body, a ½ company, ½ *sotnia*, and sometimes even a *sotnia* or more of Cossacks. In an intersected country the above intervals may be shortened, but the advanced party should always so regulate its pace and movement as to keep in view of the main body.

The latter with its baggage-train, when marching through an enemy's country, is thus divided. In front moves a detachment of sappers and a company or two of infantry. Behind these follows a portion of the artillery with one or two guns, according to the breadth of the road; then again one or two companies. After these comes the endless train, stretching for several *versts*. In rear and behind the baggage-train there follow a company of infantry, some artillery, and again a company or two of infantry. If the train be very straggling, it will be necessary to insert at various intervals along the line a company of infantry or a *sotnia*, or, if the locality admits of it, to place the same force at a distance of 500 or 600 yards from the flanks of the train. These flanking parties will follow in rear of each other; but if the train is so straggling that the companies cannot protect its flanks, ½ companies must be employed, and these must follow at such intervals as to keep in sight of each other. From a *verst* to ½ *verst* (⅔rds to ⅓rd mile) in rear of the whole body follows either a *sotnia* or ½ *sotnia* of Cossacks.

The Cossack *sotnias* with the force are so distributed as to provide quotas for its head, centre, and rear.

Provided the country admits of it, the infantry always moves in line at open order, so that the troops in rear may suffer as little as possible from dust. The Cossacks, too, move as much as possible in open order, and the artillery in column of divisions (2 guns) or ½ batteries (4 guns).

The idea of the Russian Turkistán order of march is as follows:—

The sapper detachment in front makes the road practicable. In populated localities, it has, almost at every step, to repair the bridges over the irrigating channels (*ariks*), to slope off their steep banks, and, where there are no bridges, to fill up such portions of them as cross the line of road. In moving across the steppe, too, the sappers may be of service in the .passage of ravines, streams, &c. The infantry at the head of the column serves to drive the enemy from behind cover, when moving through cultivated localities, amongst mud walls, across gardens, and so on. This body of troops at the head of the detachment would be properly called the advanced guard, for it serves, so to speak, to clear the road for the troops moving in rear of it. In marching across the steppe, one or two *sotnias* of Cossacks are sent on in advance because they can more effectually drive off any hostile gangs which may appear in sight.

The baggage-train in the centre of the order of march should be as concentrated as possible. The less space it occupies in depth, the more secure will it be from attack. Camel-trains should, if possible, move in several strings, the condition being observed that those camels which are carrying the more bulky articles, such as biscuit-bags, flour-sacks, &c., be placed on the outer ranks of the force, in order to protect the men from small arm missiles, and in order that, in case of need, the "waggon-barricade" may be the more expeditiously formed.

If, however, the train consists of carts only, it should move, by preference in two, three, or four lines, at such intervals from each other that at any moment, by a simple wheel up from the flanks, square can be formed. But if the train be mixed, the camels move in the centre of the force between the lines of carts; and if there are but few carts, they should proceed in one line, the camels being on that side upon which attack may be least expected.

The rear-guard brings up the rear of the detachment. Its duty is not only to protect the rear of the advancing force, but it has the chief and most difficult task of preventing any thing which may be thrown off the transport train *en route* falling as a trophy into the enemy's hands. The rear-guard, moreover, has to pick up the fallen camels, or to transfer the loads from those which have fallen to the healthy animals and to repair the carts, &c. Occupied with duties of this kind, the rear-guard will often arrive at the camping ground long after the main body and therefore will have less time to rest. All this makes the duty of the men on rear-guard so fatiguing that the troops comprising it should be relieved daily in such a way that the rear-guard of to-day should be told off to the advanced guard or flanking parties of the day following.

To the duties of the Cossacks who follow in rear of the main body belongs the final collection of the fallen packs, or, if these cannot be raised, their destruction. The flanking parties have to keep a sharp look out lest the enemy approach the train and throw it into disorder. The train is defended by soldiers detached from each *sotnia* or company, as well as by the formed parties which are interspersed throughout in the manner above described. These men, with the camel-drivers and cart-men, superintend the orderly advance of the train, and in case of hostile bands breaking in upon it, it is their duty to drive them off with rifle fire or bayonet charges.

In this normal order various modifications may be made, as, for instance, when an attack is expected upon the front and one of the flanks only. In such a case there is no necessity for guarding the opposite flank with flanking parties, &c. Protected in this way, the force, on being attacked by the enemy, does not form a "waggon-barricade," but continues its advance as a general rule.

In those cases in which, according to the information in our possession, the enemy is prepared to meet us in a fortified position, a field column composed of all arms is sent out from the advancing force, whilst the baggage-train, under a weaker escort, moves about in rear, until the action with the enemy in front has commenced. The train then halts and forms a "waggon-barricade" within as circumscribed a space as possible, being protected on the faces by the troops. As a rule, whilst the column which has been thrown out in advance is engaging the enemy, parties of the latter, previously detached, fall upon the train, but this, being in "waggon-barricade" formation, drives the attackers off with its escort and body of attendants and camp-followers, all of whom are armed with the exception of the hospital assistants. The actions on the Sámarkand heights in 1868, and before Zara-Bulák during the same year, were fought under similar conditions.

The length of marches across the steppe principally depends on the points at which potable water may be found. The marches vary, therefore, from 20 to 45 *versts* (13⅓ to 30 miles), or even to 50 *versts* (33⅓ miles).

Such marches should be begun as early as possible so as to reach the halting ground by day-light, and to allow time for pasturing the baggage animals. If, however, this cannot be done before nightfall, the detachment should not march before 6 or 7 A.M., so that the animals may be driven out to graze at dawn and succeed in getting even a little sustenance.

As a rule all marches should be accomplished during the day time.

Temporary halts and rest-days should be tabooed when on the steppe. The former, because they deprive man and beast of a considerable part of the time which should be passed in rest at the night halt; and the latter, because they uselessly protract the campaign, increase the quantity of supplies to be carried, and consequently add to the size of the baggage-train. Hence, both temporary halts and rest-days are subject to especially established rules, and depend exclusively on their actual urgency. Thus with marches of from 40 to 50 *versts* (26⅔ to 33⅓ miles) in length, a long halt, when half the road has been got over, is necessary, and during this the camels' loads should be removed; for no halt without such relief affords any real rest to a camel. After a succession of long marches, a day's rest is of course necessary.

Bivouacs on the steppe are usually chosen at wells, springs, or wherever there is water from some source. It is desirable, too, that there should be at such places both fuel and fodder for the horses and camels. For the first, there is *Saksaul*[1], or the root of worm-wood (*Polin*), both being frequently met with on the steppe; while the leaves and twigs of the latter growth (*Polin* or *Juzán*) likewise afford forage for the cattle.

In the absence of local obstacles on the steppe, such must be created artificially. The detachment must take up such a position as to be ready to withstand an attack and to repulse the enemy on all sides. These objects can be attached by bringing the transport train into use and by forming of it a "waggon barricade." On a given occasion the transport must be regarded either as material for the construction of a fortified position, or as a portable fort which is always present with the detachment. As the enemy may attack the position on all sides, the bivouac is arranged in a quadrilateral form. If the train consists of carts, they are so placed that the axles of the wheels lock together. So arranged, it is not easy to separate them. It should be stated that the carts should be turned with their shafts inwards. If it be desired to increase the length of the faces, the carts should be placed with their sides and not their backs towards the enemy.

When the baggage-train consists of pack-animals, the packs are arranged along the faces and form the defence.

Behind the lines of carts or camel-packs the troops are drawn up, and behind these again are the horses and camels. In the centre of the "waggon-barricade" are placed the artillery and engineer parks, hospital, staff, drivers, &c. &c.

As a guard to the camp both by day and night, it is necessary to throw out pickets. In view to lightening the sentry duty by day, it is sufficient to occupy two or three eminences with Cossack pickets. Each of these pickets should consist of three Cossacks, one of whom should be always mounted, while the two others rest with their horses picketed near them.

At night, however, the camp should be surrounded by a chain of posts thrown out to a distance of 300 paces. Each company should furnish two pickets, and the general supervision of the pickets on each face is entrusted to the commander of the particular face. Moreover, secret patrols, consisting of 4, 5, or 10 men, are posted at 2 or 3 points on those roads by which the enemy's scouts or main body may be expected. These patrols are placed in concealed spots, and serve chiefly to seize such small predatory gangs as are usually composed of a few daring men.

In support of the Cossack and infantry pickets, there should be a *service de jour* always ready for the fray. The experience of Khivan expeditions has shown that it is best to tell off this reserve for each face and not, as in European warfare, with the grand guard in the centre of the bivouac, so as to move on the alarm, wherever the commander of the detachment may direct. In Central Asian warfare the centre of the bivouac is encumbered with tents, pack and draught animals, &c., so that it would be difficult for the *service de jour* to make its way amongst such obstacles. On the other hand, one-third of such a body placed behind each face is quite sufficient to defend it—at least for a time—from an unexpected attack. Whenever an attack of the enemy in force is anticipated at night, all the troops should, of course, be under arms.

---

[1] The botanical name of *Saksaul* is *Holoxylon Ammodendron;* that of *Polin* is *Artemisia Absinthium.—Trans.*

In accordance with the above arrangements, the normal order of bivouac on the steppe for a detatchment composed of the companies, 4 *sotnias,* and one battery, is shown in figure 2 of the plate at the end of this volume.

It is, of course, to be understood that this normal order may, in course of need, be altered to suit circumstances. Thus, for instance, if the bivouac is on the banks of a broad river, or is alongside of an impassable obstacle, there is no necessity for the quadrangular formation. In such a case the bivouac may take the form of a redan, lunette, semi-circle, &c. &c. In order to give more place inside the bivouac, the companies and *sotnias* should be in open order. If necessity then requires this interior space to be still further enlarged, the angles of the faces should be piled up with packs, and the intervals between these filled up by troops. In the cultivated tracts of Central Asia, the garden walls and enclosures to be found about every inhabited spot may be utilised. In such places bivouacs are favourable, because they lighten the guard duty wherever the high walls, with which the natives usually surround their gardens, afford a ready-made defence. It is only necessary to place small pickets in front of these walls, in order to secure sufficient protection for the bivouac of the detachment. Modifications, too, may be made by posting a chain of pickets according to the lie of the ground, the direction of the roads, the nature of the enemy, and other considerations.

The protection of the animals, and especially of the horses, forms one of the chief objects of solicitude on the part of the commander of a steppe detachment. With the least negligence these animals may be driven off by even a small plundering gang, not to speak of their being startled by some trifling cause and of their taking flight into the steppe. The loss of horses and of camels would place a detachment in a most difficult and sometimes in an inextricable position, because by the loss of its cattle a detachment is deprived of the power of moving from a given spot. Central Asiatics understand this thoroughly, and endeavour in consequence to cut off the baggage animals, as they managed to do at Adam-Krilgán.

In order to avert such danger from the loss of baggage animals, the following precautionary measures should be adopted: (1): there should be permanently mounted guards over the baggage animals, both by day and night; (2) Cossack pickets should encircle the animals, one of the Cossacks in each picket should always be mounted; (3) the horses with the detachment should be shackled; (4) no horses or other animals should leave the "waggon-barricade" for pasture before the look-out pickets have occupied their appointed places, and the patrols have scoured the neighbouring locality; (5) the pickets in their turn must not quit their posts until the baggage animals, &c., have been driven back to camp.

CHAPTER IX.

FIGHTING.

Character of fighting with a Central Asian enemy—*Rôle* of infantry, artillery, and cavalry—Examples of the most brilliant Russian successes in Central Asian Wars—Examples of failures—Storming of fortified points—Tables of the losses suffered by the Russians in gaining possession of Central Asian forts, and in the open field.

The superiority of the discipline, organisation, and armament of the Russian troops over that of the enemy, is so great that, no matter how numerous the latter may be, the attainment of success in the field, provided the disposition of the troops be skilful, is not a difficult matter. The Russian soldiers, burning with the desire to measure swords with the foe, seek only the occasion of getting at him. It is not the encounter with the enemy that they fear, but the possibility that the enemy may elude them. Want of success, it is apparent, can never attend the Russian soldier. The fire of the skirmishers, the sight of the fixed bayonets, the roll of the drums, and the powerful shouting of "hurrah," produce a disturbing effect on Central Asiatics, and constrain them to seek safety in flight. An absence of all steadiness in the enemy is the reason why in Turkistán campaigns the rules of European tactics are observed in a peculiar manner. An attack is seldom prepared by skirmishers, or by artillery fire. Guns are sometimes left either under no escort at all, or under a very weak one. If attacked, the artillery is able to defend itself: cavalry advances to the storming of fortified points: infantry engages the enemy's cavalry. Neither numerical superiority, nor strong positions, nor high walls—nothing can, in fact, save the enemy from the handful of Russian troops who throw themselves manfully upon him.

The disregard of tactical rules and the exclusive employment of the charge have more than once called forth the condemnation of the critics of Central Asian campaigns. Russian troops have been censured for dashing too boldly at the enemy without previously preparing the attack by artillery fire, for often leaving that arm in rear, and for trusting too religiously to the effect of an "hurrah." The critics say that such neglect of the fundamental principles of tactics may have an unfavourable influence on the training of the troops, and that this influence may, in its turn, be sadly reflected in European campaigns. This reproach is, in a measure, justified; but, on the other hand, in the majority of cases, the Russian troops in Central Asia are right. What is the use of thinking about the preparation of the attack with artillery fire, when at any moment the enemy is ready to fly, and is not willing that our infantry should have the chance of engaging with him? Hence it is that the Russian infantry soldier hastens to attack his enemy, because he knows that with the least delay that enemy will be off. He is, at the same time, fully aware that the least wavering on his part, or the least hesitation in his attack, encourages his enemy and makes him bold.

The enumeration of all the brilliant Russian victories in Central Asia, and the recounting of all the triumphs of Russian troops in that land, would lead us away too far, but we may permit ourselves to point to the best known of them. First of all, then, we must allude to two affairs which testify, better than any, to the superiority of even the Russian irregular over his Central Asiatic foe. These witnesses are—1st, the famous three days' fight near the village of Ikán in 1864 of an Ural *sotnia* (78 men), under the command of the Yesaul Sairoff, with a band of 10,000 Khokandis led by the (in a way) skilful AlamKul; and, 2nd, the heroic affair at Chagrai in 1870, when 20 Cossacks kept several thousand Kirghiz at bay for a period of 4½ hours, until they were succoured by the arrival of a detachment of infantry which had marched 23 *versts* (16⅔ miles).

In 1860, at Uzun-Agátch (two marches to the west of the town of Vairnoye), a detachment of 800 Russians completely routed a band of more than 20,000 Khokandis.

In 1865 a Russian detachment of the same strength captured by storm the town of Táshkand, with a population of 76,000 souls.

In 1866, at Irdjár, a Russian detachment of 14 companies, 5 *sotnias*, 20 guns, and 8 rocket-stands, in all some 3,000 men, defeated the army of the Amir of Bukhára, 40,000 strong, an army which essayed for the first time to attack the Russians in the full confidence of its success. Eye-witnesses relate that in the captured Bukháran camp a letter was found, addressed by the Commander-in-Chief to his Sovereign, in which it was stated that yet another step and the Russian forces would be hurled into the Sir-Daria and drowned to the last man.

In the same year comparatively small Russian detachments captured the strongly-fortified towns of Ura-Tapa and Jizák. The garrison of the latter resolved either to conquer or to die, and so they closely shut all the gates. When, therefore, the Russians entered the town through the breaches in the walls, the enemy was literally annihilated.

In 1868, at Sámarkand, the Russian forces, numbering 3,500 men, took what in Europe would be called an impregnable position defended by 60,000 Bukhárans. The enemy occupied heights, which on the left flank were precipitous and perfectly unopen to escalade. Besides this, the whole position was covered by the Zarafshán river, which, at the time spoken of, was in flood. The Russian troops in water up to the chest, under the Bukháran artillery and falconet fire, waded through the swift river and threw themselves into the centre of the enemy's position, whereupon the defenders, stupefied by the unexpected boldness of the Russians, took to precipitate flight.

In the same year, before Zara-Bulák, a numerous body of the enemy, including about 6,000 *Sarbázis* or regular troops, that were occupying a range of heights very difficult of access, was utterly defeated by a Russian detachment of scarcely 3,000 men. The enemy himself estimated his loss on this occasion at more than 4,000 men.

From the above enumerated historical incidents it will be seen that the Russian troops in Central Asia take no account of their enemy; the more numerous he is the better they like it because their triumph over him becomes the more brilliant.

Since the time of Peter the Great, no Russian detachment of any size, which has marched against Central Asiatics, has experienced defeat in the open field. The detachment of Prince Bekóvitch Cherkásski perished in 1717, not because it was beaten in battle, but because its commander was duped after his victory at Káragatch. The Khan of Khiva, finding it impossible to contend with the Russians in the open field, had recourse to treachery. He directed that Bekóvitch should be informed that the attack made on the Russian detachment took place without his knowledge, and that he desired to be at peace with the Russians. Negociations for peace were actually being carried on, and the preliminaries of these were even settled. After the notification of the treaty in Bekóvitch's camp, the Khivan Khán invited the prince to his own camp. Bekóvitch, attended by his suite and an escort of 700 men, set out for the Khán's camp, where, according to Oriental custom, gifts were exchanged and feasting took place. The Khán swore to inviolable peace by kissing the *Korán*, whilst Bekóvitch embraced the cross. Thereupon the Khán moved with his army towards Khiva and invited Bekóvitch to accompany him. On arriving at the river Porsu, two marches from Khiva, the Khán halted and besought Bekóvitch to divide his detachment into several parties so as to make it more practicable to allot quarters for the entire force. Bekóvitch, not suspecting any foul play, confidingly split up his force into five detachments, and these were dispersed by the Khán's officials over the various quarters of the town. As soon as a considerable distance separated these small bodies from each other, the Khivans threw themselves upon them and destroyed them to a man.

Equally unsuccessful was Perovski's expedition of 1839-40, not because the Russian detachment was defeated, for, on the contrary, the Khivan forces, numbering from 2,000 to 3,000 men, were worsted, but because severe frosts, registering 30° below zero, and storms, in which men and camels were frozen, created such havoc amongst the Russian forces that they were obliged to return.

The chief arm in Central Asian, as in European, warfare is the infantry. The cavalry (Cossacks) render the greatest service in pursuits and as scouts, but in action, when it has before it a numerous and disorderly enemy, it turns itself into infantry. On such occasions the Cossacks dismount, couple their horses, and meet the enemy with carbine fire. As soon as the foe becomes disorganised, the Cossacks leap up on their horses and gallop in pursuit. This original method of cavalry fighting,—a method in which all thought of running away is discarded,—is considered by the Cossacks themselves to be "noble in the highest degree." By means of such manœuvring, the Cossacks, in spite of their greatly inferior training as compared with the infantry, have distinguished themselves in Central Asian wars by the most brilliant deeds.

In Central Asian campaigns the artillery is of great service in besieging fortresses. Nearly all the important towns of Central Asia are surrounded by high mud walls, and these are in many places flanked by two, three, and even four-storied towers. Several rows of ditches encircle the walls and are filled with water, in some cases to a depth exceeding 28 feet. On the top of the outer face of the walls are built thin crenelated curtains as high as a man; these are pierced with narrow loop-holes. The wooden gates are strengthened with iron and form a sort of corridor in the walls.

Since the fifth decade of the present century, Russian troops have had frequently to besiege and to storm towns in Central Asia. At first, having no idea as to the means of the defence of these strongholds, they acted with great caution, by throwing up approaches, opening trenches, and so on. Through such a procedure both men and time were lost in vain. It was thus that Ak-Mechet was besieged in 1853, and Fort Pishpek in 1860. Subsequently the Russians changed their tactics and, abandoning regular siege works, had recourse to open escalade. The gain in time was immense, but on the other hand the losses sustained were comparatively greater. (Witness Táshkand, Khojand, and Ura-Tapa.) After these events the Russians began to capture fortresses by storming the breaches. They threw up for this purpose breaching batteries at close range (not more than 350 yards), effected a breach in a few hours, and, selecting a favourable moment, dashed forward to the storm. This is the present and the best way of gaining possession of large Central Asian forts.

A bombardment seldom attains its object, because the warrior of Central Asia possesses in a high degree the virtue of passive bravery. A murderous fire he sustains with *sang froid,* he dies but does not surrender. He cannot, however, withstand a bold assault. It is this peculiarity which has worked out the character of Russian operations against the Central Asian foe.

The capture of towns has in all cases proved a more serious affair than an engagement in the open field. The following comparative table of the losses sustained by Russian troops in both classes of fighting is sufficient to prove what we have stated :—

I.—Table of losses borne by Russian troops in besieging and storming Central Asian fortresses.

Years.	Names of Forts.	Losses.		
		Killed.	Wounded.	Total.
1853	Ak-Mechet	25	75	100
1864	Turkistán	5	33	38
„	Chimkand	6	41	47
1865	Táshkand	25	17	42
1866	Khojand	11	122	133
„	Ura-Tapa	17	210	227
„	Jizák	6	92	98
1870	Kitáb	34	116	150

II.—Table of losses borne by Russian troops in field engagements with Central Asiatics.

Years.	Names of Engagements.	Losses.		
		Killed.	Wounded.	Total.
1860	Uzun-Agátch	2	32	34
1866	Irdjár	...	12	12
1868	Sámarkand	2	38	40
„	Zara-Bulák	...	37	37
„	Kárshi	2	10	12
1870	Kulikalau heights	7	30	37
1871	Ketmeu	2	32	34
„	Alimtu	...	5	5
„	Chin-Cha-Hodzi	1	18	19
1873	Utch-Utchák	...		
„	Sheikh-Arik	...		
„	Chandir	4	37	41
1875	Makhrám	5	9	14

If, however, the storming of Central Asian fortresses has cost the Russians dearly, it has cost the natives of Central Asia still more dearly, for their losses on the occasions above detailed have been incalculable. They are fully aware of this, and of late years have ceased to meet the Russians behind their so-called inaccessible walls. In the open field, moreover, there has remained to them some sort of hope of safety, but in a fortress they are subjected to almost utter annihilation. (Witness Jizák.)

On the other hand, the ease with which the Russians have gained victories in the open field has led them sometimes to despise their enemy and to disregard fundamental rules of tactics,—errors which have on occasions been atoned for at the price of useless losses. Meanwhile the preservation of the Turkistán soldiers should be our first care, because our detachments, in comparison with the enemy's numbers, are very weak, and because our reserves are either non-existent or else are removed so far from the theatre of war as in no way serve to fill up losses. The reinforcement, moreover, of the Russian troops in Turkistán, in the event of many casualties, is a very difficult operation, and one which requires both a high rate of expenditure and much time.

Accordingly honour and glory redound to that leader of our Turkistán troops who is able, with the fewest losses, to attain to complete success and to lead the war in question to a conclusion.

CONCLUSION.

General glance at the Turkistán Circle; its position and importance in a military and political sense—Political importance of neighbouring Asiatic States.

The Turkistán Military Circle was constituted in July 1867, chiefly out of territory that had been incorporated in the Russian Empire immediately after the union of the West Siberian and Orenburg frontiers. At that time the area of the circle equalled 14,947 square miles, and its population was 1,059,214 souls. Immediately after its formation, however, both its area and its population began rapidly to increase. Thus, in the following year, 1868, to the existing territory was added a considerable portion of the Khánate of Bukhára under the name of the Zarafshán Circle. This addition gave 400 square miles and a population of 200,000 souls. In 1870 the Russians annexed the small independent begships of Kohistán lying to the east of Sámarkand, along the upper course of the Zarafshán river, *viz.*, Matcha, Falgár, Faráb, Magián, and Kshtut. These have an area of 74 square miles and a population of 31,468. In 1871 the Upper Ili tract was acquired by Russia. This went by the name of the Kuljan Sultanate, and comprised 1,000 square miles and 100,000 inhabitants. In 1873 the Amu-Daria Section was annexed, with an area of 1,700 square miles and a population of 109,585 souls. In 1875 the Námangán Section was added, with an area of 676 square miles and 127,216 inhabitants, and in the following year, 1876, circumstances forced the Russians to include within the empire the rest of the Khánate of Khokand and to join it on to the Námangán Section under the name of the province of Farghána. The later addition gave an area of 644 square miles and 602,245 inhabitants. Besides these acquisitions, in 1868 the begship of Kárshi was conquered, and in 1870 the principality of Shahr-i-Sabz, but both were subsequently made over to the Amir of Bukhára.

Thus, from the date of the formation of the Turkistán Military Circle, nearly every year annexations have taken place which have added an area of 4,494 square miles, representing an extension of 30 per cent., and 1,171,514 inhabitants, or more than double the original number.

But what is to regulate the state of affairs according to which the force of Russian arms must penetrate further and further into the depths of the continent of Asia, and where, ultimately, will be the limits to our forward movements? An attentive examination of our relations with the neighbouring states will give a proper solution to those questions.

The Russian frontiers in Central Asia are excellently secured from outward attack. The western portion of the Turkistán Military Circle is protected by vast wastes that are sparsely inhabited by nomad races. The eastern portion from Sámarkand to the Kunges, is closed in by the massive Tián-Shán range with its difficult passes. Both the steppe and the said range present a secure line of defence which would hamper the inroads of even a civilised European foe. But the Russians in Turkistán are still more secured from attack by the weakness and political nullity of their neighbours, who cannot even threaten them in those places in which, so to speak, there are breaks in their frontier line; as, for instance, from Bukhára and from Khiva. These Khánates immediately abut on the Russian border line, but they are in complete subjection to the Russian power. Indeed the rulers of these Khánates clearly recognise their dependence on Russia, and if they sit on their unstable thrones it is only with the support of the Russian Government. The authority of these Kháns over their states is too weak to keep in order the heterogeneous elements comprising their nominally subject population.

In Khiva, from time immemorial, there has raged a bitter antagonism between the settled inhabitants of the Khánate (the Sárts) and the nomad Turkumáns, who are the real disposers of the affairs of the Khánate. Thanks to the self-will of these Turkumáns, the authority of the Khivan Khán is often fictitious; for they not only frequently refuse to pay him any taxes, but even exact such on their own account from the settled population. The large indemnity (2,000,000 *roubles*, or £200,000) which the Khivan Khánate has had to pay to Russia yearly, since the expedition of 1873, often places the Khán in straits on account of the self-will of the nomads who plunder his more peaceful subjects and threaten him with ejection from the throne. In order to support the Khán in his rights, Russian troops have from time to time to cross the Amu-Daria and by force of arms re-establish the lawful Government. The difficult position in which the Khán of Khiva is placed, has compelled him more than once to ask the Russian Administration to formally annex his state.

The dislike, however, to extending the Russian frontiers and to enlarging Russian territory in Asia, has been the reason why the Khán's request could not be complied with.

Bukhára was always considered one of the most powerful of the independent sovereignties of Central Asia. But the series of crushing defeats inflicted on this Khánate during the expeditions of 1866 and 1868, which the conduct of the Amir evoked, humbled and abased it to the rank of a vassal state. The Amir not only cannot count upon undertaking any hostile operations against ourselves, but on the contrary, like the Khivan Khán, he rules his Khánate with Russian aid alone. He fulfils unconditionally all the demands which the Russian Government may make upon him. In 1873, he afforded the Russians considerable aid by furnishing camels and supplies during the march of the Expeditionary Force to Khiva. In 1879, similar co-operation was manifested during the progress through Bukháran territory of two Russian line battalions that were *en route*, in relief of one another, between Peter Alexander and Kátta-Kurgán. The deference of the Amir has been shewn also in more serious matters. For example, after the Khivan expedition of 1873, when slavery was abolished in Khiva by General Kaufmann, it was proposed to the Amir of Bukhára that he too should do away with the slave markets within his territory, and that he should forbid all traffic in slaves for the future. The Amir of Bukhára agreed to this proposal, and now slavery in Bukhára is very rapidly passing away to the region of tradition. In return for this deference, the Russian Government not only has no designs on the Amir's possessions, but has on several occasions assisted him to extend their limits. Thus, in 1868, the Kárshi circle which had seceded from Bukhára, and which had been conquered by the Russians, was restored to the Amir. In 1870, too, the towns of Shaar and Kitáb which we took by storm, and likewise the whole of the Shahr-i-Sabz begship which had rebelled against him, were given back to the Amir. Again, in 1873, a slice of territory between Gugertli and Itchke-Yár, which had belonged to the Khán of Khiva, was made over to the Amir of Bukhára.

But, in spite of Russian support, the position of this sovereign is a very difficult one. His Khánate is constantly being torn by dissensions. One province after another rises up against him and strives for its independence. Parties, led by various pretenders to the throne, help still further to promote anarchy.

After the destruction of Sámarkand by the Russians in 1868, the south-east provinces of the Khánate of Bukhára, Hissár, Kuláb, and Shahr-i-Sabz, seceded from the Amir. As already mentioned, the last of these was restored to him solely through Russian interference, whilst the subjugation of the two former begships cost the Amir very great efforts. Supported still further by the Russians, this potentate, after re-establishing himself in 1870 in Hissár and Kuláb, extended his influence beyond to the two independent countries, Kárategin and Darwáz.

Kárategin lies to the south of the province of Farghána and of the Zarafshán Circle, along the central course of the Surkháb river (Kizil Su) from little Káramuk to the mouth of the river Khullyás, a distance of about 160 *versts* (106⅔ miles). The average breadth of this country varies from 40 to 50 *versts* (26⅔ to 33⅓ miles). On the south it touches Darwáz, and on the west the Kuláb and the Hissár begships. Kárategin at one time constituted an independent state, and was governed by rulers bearing the title of Sháh. These rulers often fell into a state of vassalship—now towards Khokand, now towards Bukhára. Khokand extended its influence over Kárategin in consequence of its greater proximity, but Bukháran influence proved the stronger, because access to Kárategin from that side is much easier and more practicable.

In the beginning of 1870, Kárategin was in vassalship to Khokand; but in the autumn of that year, the Amir of Bukhára, being strongly supported by the Russians, asserted his claims to Kárategin.

This country accordingly passed into the possession of the Amir of Bukhára, and although a fresh governor was appointed by him, he took as before the title of Sháh, and all the fealty which he showed was the yearly despatch to Bukhára of trifling tribute, in return for which the Amir in his turn conferred gifts on the Sháh of Kárategin. But in 1877 the Sháh Muhammad Saiyad was placed in confinement, and Kárategin became entirely subject to the Amir of Bukhára, who sent his own Beg to govern the country.

In the same year (1877) Darwáz, the sovereignty lying to the south of Kárategin, was united to Bukhára. The rulers of Darwáz, who also bore the title of Sháh, were kinsmen of the Kárategin rulers. Like Kárategin, Darwáz was in a very weak state of dependence on Bukhára. When, therefore, Muhammad Saiyad, Sháh of Kárategin was placed in confinement, Surajáddin Khán, ruler of Darwáz, proclaimed his independence and refused to send to the Amir of Bukhára the *tartuk*, or mark of tribute. Thereupon a Bukháran force under the leadership of Khudai-Nazar Dátkha, the new Beg of Kárategin, marched into Darwáz territory in December 1877. Apparently the war that took place was not a sanguinary one, although it lasted till the spring of the following year (1878), and this because of the deep snow and severe frosts which marked this winter throughout Central Asia. There was, indeed, only one serious fight near Kala-i-Khum, wherein the Darwázis were utterly routed. The Sháh was taken prisoner and conveyed to Bukhára, where he is still in confinement.

The greater portion of his family, including the Heir Apparent, Muhammad Afzul Khán, succeeded in escaping to Shushán, whence they made their way into the province of Farghána, where they still reside. Thus Darwáz became incorporated in the possessions of the Amir Muzaffar and Khudai-Nazar Dátkha was appointed Beg of Darwáz. Nevertheless the Bukhárans did not succeed in thoroughly pacifying the Darwázis, for in 1878 there were still some 5,000 Bukháran troops in the country drawn chiefly from Hissár and Kárategin. Hence the forts in these localities were almost without garrisons.

Thus the external activity of the Amir of Bukhára is manifested by his moving his troops about from one province to another, in order to bring each possession successively into a thorough state of subjection. Constant wars are therefore exhausting his Khánate. Taxation is very high, and the people experience difficulty in meeting it: hence there arises a general dissatisfaction with the Amir.

In the suite of the Amir of Bukhára there are many persons who are not his well-wishers. Particularly dangerous for him is the party of adherents of his eldest son, Kátta-Tura. This faction, with Kátta-Tura at its head, in 1868 nearly drove Muzaffar from his throne; and it was only through Russian interference that the Amir managed to defeat his rebel son in a fight before Kárshi and to retain possession of his rights.

There is no doubt that, in the event of the Amir Muzaffar's death, the state of affairs in the Khánate will become still more disquieting, and will in all probability require our complete intervention.

On the east the Turkistán frontier line touches the Chinese territory, *i.e.*, Eastern or Chinese Turkistán and Djungária.

Eastern or Chinese Turkistán (in other words, Lesser Bukhára, Little Tartary, or Káshgária) lies along the Tarim river system. It includes the following towns, which serve as centres of sparsely populated districts,—Káshgár, Utch-Turfán, Ak-Su, Kucha, Kurlia, Turfán, and Komul (Hámi).

These towns lie on the so-called Southern Chinese road, *i.e.*, the road made by the Chinese along the southern slopes of the Tián-Shán. At Komul this southern road joins the Northern Chinese road that runs along the northern slopes of the same range from Kulja *viá* the Talkin pass to Manás, Urumcha, and Bárkul.

To the south-east of Káshgár, and within the limits of Eastern Turkistán, there are three other towns with districts, *viz.*, Yárkand and Khotan, which lie on the old Southern Chinese road.

The towns here mentioned consist of small forts and outskirts, which are occupied by the aboriginal inhabitants of the country—Sárts, and the after-comers—Dungáns and Chinese. All these races entertain the greatest hatred for each other, and thus antagonism between the three has more than once led to insurrections. The Chinese garrisons of all the forts named above have proved too small, and, with the exception of that of Káshgár, have not exceeded a few hundred men.

In 1856, in Yunnan, the south-west province of China, there broke out the most formidable of all the Mussulmán revolts. This rapidly spread to all the remaining provinces of Western China. This revolt, known by the name of Dungán, produced terrible desolation in Djungária, in the province of Ili, and in Chinese Turkistán. The Dungáns were soon joined by their co-religionists—the Sárts—who are called in the Ili province by the name of Tarántchis.

The Khán of Khokand, wishing to take advantage of the disorders in Eastern Turkistán, sent to Káshgár a certain Buzuruk, one of the descendants of the Khojas, who ruled at one time in the country (*i.e.*, prior to 1757). With the aid of the Khokand troops, led by the brave Yákub Bek, Buzuruk Khoja gained possession of Káshgár in the year 1865. But, in consequence of his incapacity, the interloper soon lost all influence, and this passed entirely into the hands of the resolute Yákub Bek. Having sent Buzuruk out of Káshgár (in 1867) on the plea of performing a pilgrimage to Mecca, Yákub Bek remained the sole and absolute ruler of Káshgár, and, through his own energy and spirit of adventure, in a short time brought under his sway all the towns of Chinese Turkistán [1].

Intoxicated with his good fortune, Yákub Bek set no great value on friendly relations with the Russians; for Russian merchants, who reached Káshgár with their goods, were detained by him for a considerable time, even for a whole year. Their wares, too, were bought by the ruler himself at an arbitrary and very low figure, so much so that the Russian merchants sustained heavy lossess. To letters addressed to him by the Governor General of Turkistán suggesting free trade within Káshgárian limits, Yákub Bek generally replied that his country was poor and had nothing wherewith to carry on a trade. But should the Russians come to Káshgár for purposes of conquest, he would place all in the hands of God, by whose will it would be decided whether Russia should conquer Káshgár, or, on the contrary, Káshgár should conquer Russia.

---

[1] Yákub Bek at first called himself ruler of Alti-Shahr (the six cities), he then styled himself sovereign of Jiti-Shahr (the seven cities). At first, too, he bore the title of Atálik-Gázi (or the Father-Conqueror). Subsequently he assumed the designation of Badaulat (the Fortunate or the Powerful). Through this title he increased his own importance in his diplomatic relations with both the Russians and the English. Finally, he adopted the title of Amir.—*Author.*

Yákub Bek, protected as he was by the difficult Tián-Shán mountains, had some reason for counting upon the impunity of his actions. Moreover, in order to strengthen himself, he entered into relations with the English. In 1870 he sent his nephew (Shádi Mirza) to the Viceroy of India to negociate for an alliance and with a request for the supply of arms. Mr. Forsyth, the English return envoy, arrived at Yárkand at a time when Yákub Bek had entered upon a war with the Dungáns. The English envoy was not therefore received at Káshgár; indeed it was only after his second visit to Yákub Bek's territory in the year following (1871) that a polite reception was extended to the agent of the English Government. Subsequently, in 1874-75, a great embassy also under Mr. Forsyth, was sent to Yákub Bek. This, however, led to no positive results. Much more substantial were the Russian relations with the ruler of Káshgár. Whilst carrying on negociations with Yákub Bek, relative to the free movements of Russian merchants within the limits of Káshgária, the Governor-General of Turkistán engaged his attention with the repair and re-construction of the roads leading into Yákub Bek's country, so that in the event of a refusal on his part to sign a treaty, Russian troops might be marched into Káshgária and a treaty exacted by force.

Thus intimidated, Yákub Bek, in May 1872, actually affixed his signature to a treaty, similar to those executed by the Khán of Khokand and the Amir of Bukhára in 1868.

In virtue of this agreement, the sovereign of Káshgária bound himself to open to Russian merchants free passage throughout his dominions, and to take from them only such dues as corresponded with those levied on Káshgárian merchants trading in Russian territory, that is to say, 2½ per cent. *ad valorem.*

Wavering between an English and a Russian alliance, Yákub Bek ultimately recognised that he had been less slighted by Russia, and he therefore submitted himself to her influence. He was one who, by the force of his intellect and his own will, was able to keep in order the heterogeneous elements composing the population of Eastern Turkistán. On the $\frac{17\text{th}}{29\text{th}}$ May 1877 Yákub Bek died, and at once the monarchy, which he had skilfully welded together with fire and sword, fell into its component parts, which were all at variance each with the other. Disorder and mutual animosity once more set in. The Chinese then took advantage of the anarchy which prevailed to again take possession of the country. Nevertheless their rule is not on a very stable footing. One province after another rises up and strives to throw off their yoke, and the Chinese troops with difficulty keep them in subjection. In consequence of the anarchy which reigns in Eastern Turkistán trade has been stifled, and

Russian caravans have ceased to go to the country. The position of affairs is very serious, and Russian relations in this direction cannot be called favourable.

The eastern boundary of the Russian province of Semiraitchia is excellently protected by high ranges which surround the valley of the Upper Ili and include the territory of the Kuljan region.

In this country, after the expulsion of the Chinese by the Dungáns in 1865, there speedily arose an independent Sultanate, at the head of which was Abil-Oglia. This Sultanate was founded by the Taránchis, who succeeded in defeating the Dungáns and subjecting them to their power. The arrogant and presumptuous tone adopted by Abil-Oglia in his relations with the Russian Administration of Turkistán—his obstinacy and refusal to enter into any sort of comprise with us—his harbouring of deserters from Russian territory,—were the reasons which led to our conquering this Khánate in 1871, not with the object of annexing it to the Russian dominions, but of restoring it to the lawful owner, the Chinese Government, with which it would be possible to carry on regular trade and political relations. With this desire, immediately after the occupation of Kuljan territory, a communication was made to the Pekin Government regarding the despatch of a plenipotentiary and of troops to take over the Upper Ili tract as a subject province of China. Dzián-Dziun-Jun was appointed by the Bogdi Khán (title of the Chinese Emperor) to be the ruler of the province conquered by the Russians, and he speedily arrived in Russian territory and was invited to come to the town of Sergiopol in order to negociate for the rendition of this province to China. The Russian Ministry of Foreign Affairs fervently wished the transfer to take place, and therefore Major-General Boguslavski was directed to proceed to Turkistán as its agent, and he, being acquainted with the situation of affairs on the spot, was entrusted with the settlement of the business. But on his arrival at Kulja, General Boguslavski was met by a deputation of Taránchis and Dungáns, who besought his mediation with a view to the inhabitants of the country about to be restored to China becoming Russian subjects. This deputation further declared its complete aversion to the prospect of again passing under the hated Chinese yoke. The people had positively decided that, in the event of their being once more handed over to the Chinese, they would at once either exterminate their oppressors, or, if this were not possible, they would destroy themselves. The Chinese were then informed that Kulja would only be restored to them when they had succeeded in quelling the Dungán insurrection throughout the country between the Great Wall and Ili, giving complete amnesty to those who might declare their submission and had made due arrangements for the settlement of their Mussulmán subjects. During the subsequent years the Chinese really succeeded in re-establishing their authority over the outlying provinces. After again obtaining possession of Káshgária in 1877, the Chinese closed in upon the Ili province from the south and once more strenuously clamoured for its restoration.

The possession of the province of Ili is very important to the Chinese. This fertile *oasis* produces an abundance of corn, which has at all times been exported by its inhabitants to the neighbouring countries. The same country would be a good base for the Chinese on which they could operate so as to hold in subjection all the countries to the east, as far as the Great Wall. These countries are remarkable for their extreme poverty and scanty productive power, and are not capable of furnishing supplies for the Chinese troops and Administration, whilst the Ili province has always been a granary whence supplies could be readily drawn.

The transfer of Kulja to China would thus, to a considerable extent, increase her political and military importance, whilst it would, to a certain degree, weaken the Russian border line in Eastern Turkistán, for with the rendition of Kulja that frontier would be exposed and therefore easily accessible to Chinese inroads.

From all that has been said it is clear that the Russian border line in Turkistán cannot be called secure throughout its extent, notwithstanding the desire on the part of the Home Government and of the Local Administration not to go beyond our present frontier. On the east the frontier of Russian Turkistán touches Chinese provinces that have only lately passed under the rule of the Bogdi Khán, and that too after the terrible devastation known as the quelling of the Dungán rebellion. It may, moreover, be positively asserted, that if the Chinese have quelled the revolt in those provinces, and have regained possession of the country as far as Chuguchak and Káshgár, they have only done so with Russian co-operation, because it is to Russia's own interests to have her Central Asian dominions flanked by those of a sovereignty sufficiently civilised to respect international rights,—a power with which, in fact, it would be possible to enter into definite transactions of both a political and commercial kind.

Now it depends entirely on the Chinese themselves whether our expectations shall be justified, and whether friendly relations with Russia are to be maintained. Doubtless, they will find it difficult to govern their recently-subjugated population, and Russia will, of course, have to once more tender her aid to the Chinese Government. On the other hand, it is evident that, in spite of all our efforts to preserve friendly relations with the Chinese, there must be a limit to such support.

On the west our Turkistán frontier is still more insecure. Notwithstanding, therefore, what has been stated above, the Turkumán question unquestionably overbalances the scale of our Central Asian *politique*. On reaching the Amu-Daria, Russia came into juxta-position with tribes in the highest degree unbridled and self-willed, and which acknowledged no international treaties or rights.

Russia's position as regards the Turkumáns is completely analogous to that in which she stood towards the Kirghiz during the last and in the first half of the present century. Like the Turkumáns, the Kirghiz made constant raids on our Orenburgh-Siberian frontier—seized and carried off into slavery Russian subjects—plundered our trade caravans *enroute* from Orenburgh, Orsk, Troitsk, and Petropávlosk to the Central Asian Khánates—attacked Russian detachments escorting these caravans—and rendered all communication with the settled peoples of Central Asia impossible. The different measures which our Government adopted in order to pacify the Kirghiz steppe (seizure of hostages, yearly military expeditions, &c.) led to no results. Matters changed considerably for the better, when in the year 1840, at the instance of General Obrucheff, our hold on the steppe became more real through the construction of forts in the midst of the territory traversed by the nomads. Russian troops now appeared as a permanent force wherewith to hold in subjection nationalities which hitherto had acknowledged no authority and no element of order.

The object was finally attained, when, through the construction of similar forts, we became masters of the wintering grounds of the nomads—that is to say, when we held in our grasp the very essence of their existence, and when these nomads in their migrations never passed beyond the limits of Russian surveillance.

In the present day the Turkumáns, like the Kirghiz of old, attack our subjects, carry them off into slavery, plunder our transports on the Caspian, rob our trading caravans, and prevent the opening out of direct communication between the basin of the Lower Amu and the Caspian; such communication being indispensable to us in order that our hold on Central Asia may secure for us substantial advantage.

The solution of the Turkumán question in principle is easy, because we have before our eyes very solid experience gained in the settlement of that perfectly analogous question, the Kirghiz. The bringing together of the Western Siberian and Orenburgh frontier lines which we effected in 1864-65 has its counterpart now in the approaching junction of our Turkistán and Caucasian provinces. It is only by such a union of our border lines that order can be attained on the Turkumán steppe, tribal dissensions quenched, regular trade between the basin of the Amu and the east coast of the Caspian established, and direct communication between the heart of European Russia and Central Asia spread out—that is to say, the realisation of the idea bequeathed to us by the genius of Peter the Great.

The union of our Turkistán and Caucasian possessions will bring us, too, another real advantage. Our territory will then run parallel with Persian soil, and will draw near to England's Indian possessions; that is to say, we shall then be the neighbours of powers who respect international treaties, and with whom it will be possible to have regular relations. Particularly advantageous will it be to us to have as our neighbours such a strong and mighty sovereignty as England. The dread of Englishmen of our approach to their Indian frontiers, will gradually disappear when they have become convinced that no ambitious designs and no self-interested calculations guide Russia in her progressive movements in Central Asia, but the sole desire to pacify the country, to give impulse to its productive forces, and to open out the shortest route by which she can transport the products of her Turkistán possessions to the European portion of her Empire.

THE END.

APPENDICES.

APPENDIX

Alphabetical List of some of the places and points in Turkistán, the alti tude and longitude have been ascertained

Compiled from the English Edition of Vol. I, Kostenko's "Turkistán" in the Intelli Bengal Infantry.

PLACES OR POINTS.	Height in feet.	Observer.	Latitude.	Probable error.
A				
Achál	4,953	S.	...	...
Adun-Kur pass	9,280	L.	...	...
Agáta, Pole	...	...	41° 8′ 57·6″	...
Agir-Tapa, postal station . .	2,230	S.	...	...
Agiyách river, at the bridge . .	5,970	L.	...	...
Aiaguz, central picket	...	...	47° 49′ 52″	...
Aiaguz, picket	...	...	47° 50′ 8″	...
Aigerik lake	...	...	45° 58′ 44″	...
Aikul lake	2,160	...	...	...
Aivás-Tapa	1,410	Z.	...	...
Aivás-Tapa, Pyramid Vz. . .	...	...	41° 12′ 36·4″	...
Akai (well at)	...	...	46° 29′ 40″	...
Ak-Baitàl (name given to a river before it issues from the hills into the basin of lake Sairám No. 1) .	7,960	L.	...	...
Ak-Bel pass	12,060	K.	...	...
Ak-Bulák (well at)	...	...	46° 10′ 20″	...
Ak-Chaganák	...	...	43° 57′ 18″	...
Ak-Jandi river	13,160	M.	...	...
Ak-Jár, postal station . . .	1,650	S.	...	...
Ak-Jár, a Kirgiz tomb on a mountain flanking the Sir-Daria . .	...	...	45° 35′ 57″	...
Ak-Julpas, a tomb on the mountain.	...	...	46° 41′ 46·8″	...
Ak-Kuduk (well at)	...	...	46° 36′ 20″	...
Ak-Rabát pass	4,590	Schv.	...	...
Ak-Sai mountain	6,970	...	...	...
„ village	2,730	...	...	...
„ end of Startseff's route in the valley of the . . .	...	...	40° 50′ 17″	± 4″
Ak-Su mineral springs, 2¾ miles from the village of the same name.	8,180	L.	...	...
„ postal station . . .	2,100	S.	...	...
„ river	9,110	L.	...	...
„ „ at the foot of the hills .	6,330	...	...	...
„ village	5,800	...	...	...
„ fort of	...	...	42° 50′ 18″	...

EXPLANATION OF

A.	Aminoff.
Astr. D.	Astronomical determinations.
Astr. O.	Astronomical observations.
Bons.	Bonsdorff.
Br. U. I.	Brauer's universal instrument.
Bun.	Bunyakóvski.
But.	Butakoff.
Chr. Surv.	Chronometers of survey.
K.	Kaulbárs.
Kur.	Kuropátkin.
L.	Larióneff.
M.	Michelson.
Par.	Pariiski.
Cir.	Pistoroff's circle.

* The longitude of the Observatory

I.

tude of which has been barometrically determined, and of which the lati-
either astronomically or trigonometrically.

gence Branch, Quartermaster General's Department in India, by Major W. E. Gowan.

Longitude east of Pulkoff.*	Probable error.	Instrument.	Observer.	How obtained.	Year.	Longitude east of Greenwich.
...	...	...	...	...	...	...
...	...	...	...	...	...	...
39° 2′ 47″	...	Br. U. I.	Zam.	Tri.	1871	69° 22′ 27·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
49° 39′ 29″	...	...	...	Astr. D.	1862-65	79° 59′ 29·5″
49° 40′ 1″	...	...	...	Astr. D.	1832-37	79° 59′ 41·5″
31° 36′ 28″	...	...	...	Astr. D.	1846	61° 56′ 8·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
39° 4′ 19″	...	Br. U. I.	Zam.	Tri.	1871	69° 23′ 59·5″
32° 19′ 34″	...	...	...	Astr. D.	1846	62° 39′ 14·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
32° 6′ 1″	...	...	...	Astr. D.	1846	62° 25′ 41·5″
36° 32′ 30″	...	...	But.	Astr. D.	1863	66° 52′ 10·5″
...	...	.	...	...	...	...
...	...	..	...	...	...	...
32° 55′ 1″	...	...	...	Astr. D.	1846	3° 14′ 41·5″
31° 25′ 40″	...	Reps. V.C.	...	Chr. Surv.	1869	61° 45′ 20·5″
31° 31′ 58″	...	...	...	Astr. D.	1846	61° 51′ 38·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
45° 51′ 12″	± 1″	Pist. Cir.	Sharn.	Chr. Surv.	1872	76° 10′ 52·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
43° 46′ 48″	...	...	Str.	Astr. D.	1865	74° 06′ 28·5″

ABBREVIATIONS.

R.	Reintál.
Reps. V. C.	Repsold's vertical circle.
Rod.	Rodiónoff.
Rud.	Rudneff.
S.	Skássi.
Schv.	Schvarts.
Sharn.	Shárngorst.
She.	Shemanóvski.
Sir.	Sirovátski.
Str.	Struve.
Tra. Ins.	Transit instrument.
Tri.	Triangulation.
Zal.	Zalaisski.
Zam.	Zamóchnikoff.

of Pulkoff is 30° 19′ 40·5″ east of Greenwich.

Alphabetical List of some of the places

Places or Points.	Height in feet.	Observer.	Latitude.	Probable error.
Ak-Tapa	...	...	39° 55′ 35″	...
Ak-Tapa, Pyramid G.	...	...	41° 20′ 15·6″	...
„ „ K.	...	...	41° 21′ 15·5″	...
„ „ O.	...	...	40° 11′ 0·5″	...
„ „ O.	...	...	41° 21′ 36·1″	...
„ „ Q.	...	...	41° 18′ 35·6″	...
Ak-Tásh, postal station	1,700	S.	...	...
„ at the shore of Lake Chádir Kuli (mouth of the river)	...	...	40° 42′ 36″	± 4″
Ala-Baitál pass to the south of Lake Kára-Kul on the Pámir	15,340	M.	...	...
Alai valley on the road from the pass of Archát to the pass of Kizil-Art	10,120	M.	...	...
Alexander range, limit of vegetation on the higher ranges	9,670	Bun.	...	...
Almáta gorge	10,900	...	...	...
Alti-Kuduk (well at)	...	...	46° 50′ 25″	...
„ (postal station at)	...	...	46° 49′ 59″	...
Altin-Imel pass	5,963	S.	...	...
„ picket	4,000	...	44° 19′ 24″	...
„ postal station	4,427	S.	...	...
Altin-Tapa, Pyramid P.	...	...	41° 19′ 15·7″	...
Amchin-Kol river	6,540	She.	...	...
Amu crest	5,760	A.	...	...
„ mountain	11,100	S.	...	...
„ river at its meeting with the Zarafshán	5,300	...	...	...
Andiján	...	...	40° 47′ 56″	...
„ Pyramid N. 1	...	...	40° 46′ 57·9″	...
„ (camp at)	...	...	40° 49′ 49″	...
An-Kártik river	9,433	L.	...	...
Anzób pass (into Hissár)	12,000	S.	...	...
„ „	11,200	...	...	...
„ range facing the village of the same name	9,740	A.	...	...
„ village	6.700	S.	...	...
„ „	6,840	...	...	...
Arálik „	...	...	39° 33′ 19·2″	...
Araván	2,670	M.	...	...
Archa-Bulák on the Alai	9,960	M.	39° 40′ 55″	...
Archát pass across the Alai range	11,920	M.	...	...
Arelin river at its junction with the River Kásh	5,360	L.	...	...
Aris on a stream distant 7½ miles from the ancient Otrar	...	...	42° 45′ 48″	...
Arobogut	...	...	46° 9′ 36″	...
Arshán Alsháli river issuing from mineral springs	6,470	L.	...	...
Arshán spring on the higher course of the River Kunges	8,000	L.	...	...
Arshán Tsogán river issuing from mineral springs 13⅓ miles from its junction with the Kásh	8,100	L.	...	...

and points in Turkistán, &c. —continued.

Longitude east of Pulkoff.	Probable error.	Instrument.	Observer.	How obtained.	Year.	Longitude east of Greenwich.
36° 4′ 21″	...	Br. U. I.	Par.	Tri.	1876	66° 24′ 1·5″
38° 58′ 11″	...	...	...	...	...	69° 17′ 51·5″
38° 47′ 57″	...	...	...	...	...	69° 7′ 37·5″
39° 6′ 1″	...	Br. U. I.	Rud.	Tri.	1873	69° 25′ 44·5″
38° 59′ 0″	...	Br. U. I.	Sir.	Tri.	1872	69° 18′ 40·5″
38° 51′ 0″	...	Br. U. I.	Sir.	Tri.	1872	69° 10′ 40·5″
...	...	...	...	...	...	...
45° 4′ 18″	± 1′	Pist. Cir.	Sharn.	Tri.	1872	75° 23′ 58·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	62° 8′ 14·5″
31° 28′ 34″	...	...	...	Astr. D.	1846	...
31° 26′ 15″	...	Reps. V. C.	...	Chr. Surv.	1869	61° 45′ 55·5″
...	...	...	...	...	...	...
48° 10′ 20″	...	...	...	Astr. D.	1859	78° 30′ 0·5″
...	...	...	...	...	...	...
38° 46′ 39″	...	Br. U. I.	Sir.	Tri.	1872	69° 6′ 19·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
42° 2′ 12″	...	...	Str.	Astr. D.	1870	72° 21′ 52·5″
39° 2′ 7″	...	...	...	...	...	...
41° 58′ 38″	...	Pist. Cir.	Bons.	Chr. Surv.	1875	69° 21′ 47·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
36° 41′ 4″	...	Br. U. I.	Par.	Tri.	1876	67° 0′ 44·5″
...	...	...	...	...	...	...
42° 45′ 10″	...	Pist. Cir.	Bons.	Chr. Surv.	1876	73° 4′ 50·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
37° 56′ 42″	...	...	But.	Astr. D.	1863	68° 16′ 22·5″
31° 19′ 35″	...	...	...	Astr. D.	1846	61° 39′ 15·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...

Alphabetical List of some of the places

PLACES OR POINTS.	Height in feet.	Observer.	Latitude.	Probable error.
Arsháti, tributary of the Greater Yulduz	9,960	L.	...	...
Arsita (ford)	8,590	L.	...	...
Arustán village on the right bank of the River Ili	2,600	L.	...	...
Aulie-Ata, postal station in the town of the same name	2,150	S.	...	...
Aulie-Ata fort	...	...	42° 53′ 42″	...
B				
Babruk (Southern) river	8,990	L.	...	...
„ (pass)	11,520	L.	...	...
„ (Northern) river	8,880	L.	...	...
„ (at the foot of the larger mountains)	6,250	L.	...	...
„ (ford)	4,950	L.	...	...
Baisun, town in the province of Hissár.	3,410	Schv.	...	...
Baisun, house of the Diván-Begi	...	...	38° 11′ 58″	...
Baitakoi, village on the right bank of the River Ili	2,620	L.	...	...
Bakhta (idol temple at)	...	...	46° 46′ 17″	...
Bakshi, postal station	3,760	S.	...	...
Báljuán, town in Hissár	2,130	Schv.	...	...
„ garden near the citadel	...	...	38° 18′ 13″	...
Balkhásh lake, mouth of the River Lepsa	...	...	46° 20′ 22″	...
Bálta-Tarak (graphite mines of)	...	...	48° 6′ 19″	...
Bargati river issuing from mineral springs	5,360	L.	...	...
Bargati river	4,900	Schv.	...	...
„	5,432	She.	...	...
„	7,245	She.	...	...
Bárlik (idol temple at)	...	...	45° 49′ 17″	...
Bárskun (mouth of the river at Issik-Kul)	...	...	42° 11′ 29″	±4′
Bárskun pass to the south of Issik-Kul	11,810	K.	...	...
Baschuk pass	10,900	L.	...	...
„ Su	9,320	L.	...	...
Básh-Chárbágh	520	Schv.	...	...
Bayáldir-Tugai (natural boundary)	...	...	42 1′ 42″	...
Beglár-Begi, postal station	2,350	S.	...	...
„ (mosque of), Pole No. 2	...	...	41° 19′ 36·2″	...
Berke river at its junction with the Kunges	5,120	L.	...	...
Bilgu mountain	9,850	...	...	...
Bir-Isbák, Pyramid I.	...	...	40° 7′ 30·7″	...
Bish-Agách	932	Z.	...	...
„ Pyramid Hz.	...	...	40° 20′ 46·7″	...
Bish-Kána, Pyramid	...	...	39° 40′ 52·6″	...
Bish-Mainak pass	10,520	K.	...	...

and points in Turkistán, &c.—continued.

Longitude east of Pulkoff.	Probable error.	Instrument.	Observer.	How obtained.	Year.	Longitude eas of Greenwich.
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
41° 3′ 36″	...	...	Str.	Astr. D.	1865	71° 23′ 16·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
36° 54′ 53″	...	Pist. Cir.	Sch. V.	Chr. Surv.	1875	,67° 14′ 33·5″
...	...	...	...	...	...	...
52° 28′ 14″	...	...	...	Astr. D.	1862	82° 47′ 54·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
39° 21′ 21″	...	Pist. Cir.	Schv.	Chr. Surv.	1875	69° 41′ 1·5″
48° 0′ 49″	...	...	...	Astr. D.	1832-37	78° 20′ 29·5″
50° 43′ 50″	...	Tra. Ins.	Bons. Schv.	Astr. D.	1862-65	81° 3′ 30·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
52° 2′ 42″	...	...	...	Astr. D.	1862	82° 22′ 22·5″
47° 16′ 24″	±1′	Pist. Cir.	Sharn.	Chr. Surv.	1872	77° 36′ 4·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
37° 49′ 42″	...	...	But.	Astr. D.	1863	68° 9′ 22·5″
...	...	...	...	...	...	...
38° 54′ 30″	...	Br. U. I.	Sir.	Tri.	1872	69° 14′ 10·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
37° 25′ 25″	...	Br. U. I.	Sk.	...	1874	67° 45′ 5·5″
...	...	...	...	...	...	...
38° 52′ 22″	...	Br. U. I.	Zam.	Tri.	1871	69° 12′ 2·5″
36° 58′ 22″	...	Br. U. I.	Zal.	Tri.	1874	67° 18′ 2·5″
...	...	...	...	...	...	...

PLACES OR POINTS.	Height in feet.	Observer.	Latitude.	Probable error.
Biskand, Pole N.	...	...	39° 41′ 34″	...
Bogushti pass	12,500	K.	...	...
„ „	12,750	Bun.	...	...
„ „	10,700	R.	...	...
„ „ (limit of vegetation)	8,000	R.	...	...
Bokále (well at)	...	...	42° 40′ 30″	...
Bokshirga river at the foot of the mountains	3,600	L.	...	...
Borgusta river at its junction with the Chákir (Nilka)	4,040	L.	..	...
Borgusta river, at its junction with the Toskour	5,150	L.	...	...
Borgusta river, 10⅓ miles from the mouth of the pass of the same name	2,190	L.	...	...
Borogobosun, northern exit from the mountains	3,000	S.	...	...
Borogobosun pass (Tsiterti)	7,590	L.	...	...
Borogobosun	5,450	L.	...	...
Boro-Khoro	8,774	She.	...	...
„ spring	9,120	L.	...	...
„ at its junction with the Bagád-Tsit	8,700	L.	...	...
Borokhuzir (or Borohudzir), postal station	2,280	S.	...	...
Borokhuzir (or Borohudzir) picket	3,980	...	44° 23′ 8″	...
Borotóla river below Mount Bogdo	4,100	L.	...	...
„ above its junction with the Uch-Isapai	3,510	L.	...	...
Borotóla at its junction with the Archeta-Su	2,880	L.	...	...
Borotóla at Sárbuk	2,500	L.	...	...
Buguna coal mines on the river	...	...	43° 2′ 54″	...
Buka village	1,173	Z.	...	...
Buka (village of) Pyramid Mz.	...	...	40° 50′ 7″	...
Bukhára, palace of the Amir	...	...	39° 46′ 45″	...
Buluki, 1⅓ miles from the mountain	3,315	S.	...	...
Burdu-Su at the third watercourse after the issue of the river from the mountain	2,720	L.	...	...
Burmam (well at)	...	...	46° 37′ 32″	...
Burul-Bura river	6,124	She.	...	...
C				
Chábdár mountain	18,300	S.	...	...
Chádir-Kul lake	11,210	K.	...	...
„ „	11,050	Bun.	...	...
Chagán-Sai river	5,320	L.	...	...
Chagán-Togói (idol temple at)	...	...	46° 9′ 29″	...
Chahár-Bágh Pyramid	...	...	39° 34′ 20·6″	...
„ Pole No. 3	...	...	39° 34′ 14·2″	...
Chákir Pyramid	...	...	39° 57′ 0·5″	...
Chak-Pák pass and postal station	3,600	S.	...	...
Chákir-Korum pass	12,300	K.	...	...
Cháldavar, postal station	2,630	S.	...	...

and points in Turkistán, &c.—continued.

Longitude east of Pulkoff.	Probable error.	Instrument.	Observer.	How obtained.	Year.	Longitude east of Greenwich.
36° 55′ 33″	...	...	...	...	1871	67° 15′ 13·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
33° 2′ 41″	...	Pist. Cir.	Sharn.	Chr. Surv.	1871	63° 22′ 21·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
49° 28′ 35″	...	...	...	Astr. D.	1859	79° 48′ 15·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
39° 32′ 6″	...	...	Str.	Astr. D.	1865	69° 51′ 46·5″
...	...	...	...	...	...	...
38° 53′ 33″	...	Br. U. I.	Zam.	Tri.	1871	69° 13′ 13·5″
34° 6′ 57″	...	...	...	Astr. D.	1858	64° 26′ 37·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
32° 23′ 25″	...	...	...	Astr. D.	1846	62° 43′ 5·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
52° 9′ 44″	...	...	...	Astr. D.	1862	82° 29′ 24·5″
36° 46′ 29″	...	Br. U. I.	Zal.	Tri.	1874	67° 6′ 9·5″
36° 49′ 54″	...	...	...	...	...	67° 9′ 34·5″
38° 27′ 41″	...	Br. U. I.	Sk.	Tri.	1874	68° 47′ 21·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...

PLACES OR POINTS.	Height in feet.	Observer.	Latitude.	Probable error.
Changaul Pyramid . . .	...	...	39° 37′ 4·7″	...
Chánsk, town	944	Z.	...	...
„ Pyramid C. . . .	...	...	40° 33′ 54·4″	...
Chapán-Ata, mouth of the river at Lake Issik-Kul	...	...	42° 38′ 37″	±4″
Chapchál pass	8,940	L.	...	...
Chár-Guduk pass	9,840	K.	...	...
Chárik-Kul lake	1,340	...	...	...
„ Karitma pass . . .	8,410	Schv.	...	...
Chártak Pole	...	...	40° 11′ 13·1″	...
Chasma-i-Háfiz-Ján hamlet . .	3,540	L.	...	...
Chau-Tapa Pole	...	...	39° 36′ 21·5″	...
Chebati pass	7,250	K.	...	...
Chelgói river	2,580	L.	...	...
Cheshái-Tura river at its junction with the River Ir-Tásh . .	9,900	L.	...	...
Chibin-Tapa	1,295	Z.	...	...
Chichi river Pyramid Cz. . .	...	...	41° 8′ 0″	...
„	4,673	She.	...	...
Chigotai-Tapa, Pyramid L. . .	...	...	41° 20′ 54″	...
Chilek town	2,160	...	...	...
Chil-Makhrám	1,240	M.	...	...
Chimbai, Pyramid I . . .	...	...	39° 51′ 6·0″	...
„ „ II . . .	...	...	39° 52′ 45·5″	...
„ „ III . . .	...	...	39° 50′ 10·7″	...
Chimkand, town and postal station .	1,650	S.	...	...
„ „	...	...	42° 18′ 6″	...
Chim-Kurgán, village . . .	1,710	Schv.	...	...
„ ruined fort on the Sir-Daria . .	...	...	45° 1′ 53″	...
Chináz fort	770	She.	40° 56′ 0″	...
„ (the barbette of the lunette) .	...	...	40° 54′ 28·2″	±0·73″
Chingildin, postal station . .	2,070	S.	...	...
Chin-Ji, picket	1,691	She.	...	...
Chirákchi, town	1,340	Schv.	...	...
Chirchik, postal station . . .	1,110	M.	...	...
Chon-Su river on the Pámir . .	13,270	M.	...	...
Chulák-Terek river . . .	5,100	L.	...	...
Chulpán-Ata, postal station . .	5,430	L.	...	...
Chupán-Ata mountain . . .	2,640	...	...	...
Churcha, Pyramid I . . .	...	...	39° 53′ 12″	...
„ „ II	...	...	39° 50′ 37″	...
Chushka-Guzár, an island on the Amu-Daria	...	...	37° 21′ 51″	...
Chushka-Guzár, ferry at the Amu-Daria	960	Schv.	...	...
D				
Daganáta	1,317	Z.	...	...
„ Pyramid Ez. . . .	...	...	40° 59′ 33″	...
Dágbit village	2,100	...	...	...
Dagit pass	10,650	L.	...	...
„ river where it issues from the mountains . . .	9,220	L.	...	...
Dakh-Kára-Kand pass . . .	3,840	Schv.	...	...

and points in Turkistán, &c.—continued.

Longitude east of Pulkoff.	Probable error.	Instrument.	Observer.	How obtained.	Year.	Longitude east of Greenwich.
36° 56′ 51″	...	Br. U. I.	Zal.	Tri.	1874	67° 16′ 31·5″
...	...	...	...	...	...	...
38° 49′ 59″	...	Br. U. I.	Zam.	Tri.	1871	69° 9′ 39·5″
46° 49′ 18″	±1′	Pist. Cir.	Sharn.	Chr. Surv.	1872	77° 8′ 58·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
37° 36′ 24″	...	Br. U. I.	Sk.	Tri.	1874	67° 56′ 4·5″
...	...	...	...	...	...	...
37° 3′ 4″	...	Br. U. I.	Zal.	Tri.	1874	67° 22′ 44·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
38° 59′ 15″	...	Br. U. I	Zam.	Tri.	1871	69° 18′ 55·5″
...	...	...	...	...	..	...
38° 51′ 22″	...	Br. U. I.	Sir.	Tri.	1872	69° 11′ 2·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
36° 12′ 34″	...	Br. U. I.	Par.	Tri.	1876	66° 32′ 14·5″
36° 6′ 33″	...	Br. U. I.	Par.	Tri.	1876	66° 26′ 13·5″
36° 7′ 36″	...	Br. U. I.	Par.	Tri.	1876	66° 27′ 16·5″
...	...	...	...	...	...	...
39° 16′ 18″	...	...	Str.	Astr. D.	1865	69° 35′ 58·5″
...	...	...	...	...	...	...
34° 27′ 59″	...	..	...	Astr. D.	1858	64° 47′ 39·5″
38° 26′ 36″	...	Br. U. I.	Str.	Astr. D.	1865	68° 46′ 16·5″
38° 22′ 35″	±1·44″	Reps. V. C.	Sharn.	Chr. Surv	1871	68° 47′ 39·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
36° 2′ 17″	...	Br. U. I.	Par.	Tri.	1876	66° 21′ 57·5″
36° 4′ 44″	...	Br. U. I.	Par.	Tri.	1876	66° 24′ 24·5″
36° 27′ 52″	...	Pist. Cir.	Schv.	Astr. Surv.	1875	66° 47′ 32·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
38° 59′ 44″	...	Br. U. I.	Zam.	Tri.	1871	69° 19′ 24·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...

Alphabetical List of some of the places

PLACES OR POINTS.	Height in feet.	Observer.	Latitude.	Probable error.
Dálvorzin	932	Z.	...	...
„ Pyramid F.	...	...	40° 26′ 10·4″	...
Darakhi pass	13,000	S.	...	...
Daraut-Kurgán on the Alai	7,990	M.	...	...
„ (camp a short distance from) on the Alai	...	...	39° 32′ 51″	...
Dara-Várd mountain at the junction of the Fan-Daria and the Zaráfshán	10,600	S.	...	...
Darband, town in Hissár	2,950	Schv.	...	...
Dárdár village	4,520	A.	...	...
Dasht-i-Nauvát village	1,840	Schv.	...	...
Daul Pyramid	...	...	39° 46′ 11·1″	...
Dembai, Pyramid P.	...	...	40° 11′ 38·6″	...
Denen	1,294	Z.		
Dih-i-Nau, house of Muhammad Nazar	...	...	38° 16′ 12″	...
Dih-i-Nau town	1,080	Schv.	...	...
Diminár village	7,800	S.	...	...
Din-Kurgán	...	...	43° 52′ 0″	...
Diváṇa	...	...	40° 30′ 54″	...
Dobal (well at)	...	...	47° 2′ 6″	...
Dresh hamlet	5,040	M.	...	...
Dulánji river where it issues from the mountains	1,950	L.	...	...
Dulberjin pass	9,160	L.	...	...
Dun-Buda picket	1,815	She.	...	...
Dundu-Jin river	8,600	She.	...	...
Durman-Kul lake	2,000	...	...	...
Durman, Pyramid Qz.	...	...	40° 54′ 6·8″	...
Durt-Kul hamlet	1,410	Schv.	...	...
Durt-Kul-Tapa Pyramid	...	...	40° 6′ 45·2″	...
Dushambe, town in Hissár	2,070	Schv.	...	...
Duvána-Rabát	1,220	M.	...	...
E				
Ebi-Nor lake	671	She.	...	...
„ „	870	L.	...	...
Epte river at its source	8,160	L.	...	...
F				
Faizábád citadel	...	...	38° 31′ 10″	...
Faizabád pass	3,350	Schv.	...	...
„ town	3,020	Schv.	...	...
Fárish	...	...	40° 34′ 1″	...
Fazil-Tapa, Pyramid F.	...	...	41° 15′ 16·8″	...
Fort No. 1, S. W. Bastion	...	...	45° 45′ 32″	...
„ No. 1	...	...	45° 45′ 42″	...
„ No 2, south-east angle of	...	...	45° 29′ 9″	...
„ No. 2	...	...	45° 29′ 6″	...
G				
Gol-i-Zindán pass	3,580	Schv.	...	...
Gorundi pass into the valley of the Kok-Su	10,550	M.	...	...

and points in Turkistán, &c.—continued.

Longitude east of Pulkoff.	Probable error.	Instrument.	Observer.	How obtained.	Year.	Longitude east of Greenwich.
...	...	...	...	...	...	...
38° 51′ 30″	...	Br. U. I.	Zam.	Tri.	1871	69° 11′ 10·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
41° 50′ 43″	...	Pist. Cir.	Bons.	Chr. Surv.	1876	72° 10′ 23·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
36° 23′ 5″	...	Br. U. I.	Par.	Tri.	1876	66° 42′ 45·5″
39° 11′ 24″	...	Br. U. I.	Rud.	Tri.	1873	69° 31′ 4·5″
...	...	...	...	...	...	...
37° 34′ 37″	...	Pist. Cir.	Schv.	Chr. Surv.	1875	67° 54′ 17·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
36° 51′ 54″	...	...	But.	Astr. D.	1863	67° 11′ 34·5″
41° 8′ 26″	...	Pist. Cir.	Bons.	Chr. Surv.	1875	71° 28′ 6·5″
31° 17′ 20″	...	...	...	Astr. D.	1846	61° 37′ 0·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
38° 40′ 51″	...	Br. U. I.	Zam.	Tri.	1871	69° 20′ 31·5″
...	...	...	...	...	...	...
37° 49′ 47″	...	Br. U. I.	Sk.	Tri.	1874	68° 9′ 27·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
39° 0′ 7″	...	Pist. Cir.	Schv.	Chr. Surv.	1875	69° 19′ 47·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
36° 34′ 17″	...	Pist. Cir.	Sharn.	Tri.	1871	66° 53′ 57·5″
38° 52′ 12″	...	Br. U. I.	Sir.	Tri.	1872	69° 11′ 52·5″
31° 50′ 20″	...	...	...	Astr. D.	1855	62° 10′ 0·5″
31° 47′ 5″	...	...	...	Astr. D.	1863	62° 6′ 45·5″
33° 49′ 10″	...	...	...	Astr. D.	1858	64° 8′ 50·5″
33° 50′ 12″	...	...	...	Astr. D.	1863	64° 9′ 52·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...

Places or Points.	Height in feet.	Observer.	Latitude.	Probable error.
Gulcha	5,100	M.	...	...
Gus village	3,560	...	...	...
H				
Hája-Kishlák Pyramid . . .	...	...	40° 2′ 25·1″	...
Hissár town	1,580	Schv.	...	...
I				
Ike-Kizyák on the road to Káshgar .	9,820	Kur.	...	...
Ili fort	1,458	S.	...	...
„ „	1,300	...	...	...
„ „	1,530	...	43° 52′ 4″	...
Ingichke river	10,990	M.	...	...
Inilchek river before it descends the Tech pass . .	8,370	L.	...	...
„ „ at its junction with the Sari-Jáz . .	8,110	L.	...	...
Iori village	4,030	S.	...	...
Irkibai on the southern bank of Yáni-Daria	...	...	43° 59′ 2″	...
Irkishtám post (on the road to Káshgár)	8,540	Kur.	...	...
Iron gates, eastern end . . .	3,540	Schv.	...	...
„ „ western end . .	3,740	Schv.	...	...
Ir-Tásh river at its rise . .	10,910	K.	...	...
Ishigárt pass	12,620	K.	...	...
Iskandar-Kul lake . . .	6,770	A.	...	...
„ „ „	7,260	...	...	...
„ „ „ (three volcanoes in the neighbourhood of the lake.)	10,100 10,200 10,500	S.	...	...
„ „ „ (former level of the lake) .	7,110	S.	...	...
„ „ „ ditto .	7,000	S.	...	...
„ village from a rock overhanging it	5,200	S.	...	...
Issik-Kul Lake, south of the River Tup at	...	...	42° 43′ 44″	± 4″
It-Bulák Pyramid . . .	...	...	40° 2′ 57·3″	...
J				
Jalpán	1,165	Z.	...	...
Jámbi river (in the pass) . .	7,330	L.	...	...
„ „ (outside the pass) .	8,850	L.	...	...
Jambulák	1,281	Z.	...	...
„ Pyramid E. . . .	...	...	40° 30′ 1·6″	...
Jám village	2,050	...	...	...
Jámdi pass on the Greater Yulduz .	10,730	L.	...	...
Jan-Bulák	890	M.	...	...
Jási pass (Bichán) . . .	11,240	K.	...	...
Jau-Chakán, Pole S. . . .	...	...	40° 49′ 17″	...
Jen, Pole S.	...	...	41° 0′ 52·3″	...
Jergalán river at its junction with the Tekes (at its source) .	3,610	L	...	...
„	6,700	L.	...	...

and points in Turkistán, &c.—continued.

Longitude east of Pulkoff.	Probable error.	Instrument.	Observer.	How obtained.	Year.	Longitude east of Greenwich.
...	...	...	...	...	...	...
...	...	...	...	...	...	...
38° 38′ 22″	...	Br. U. I.	Sk.	Tri.	1874	68° 58′ 2·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
46° 52′ 50″	...	...	...	Astr. D.	1859	77° 12′ 30·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
32° 28′ 54″	...	Pist. Cir.	Sharn.	Chr. Surv.	1871	62° 48′ 34·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
48° 4′ 6″	± 1′	Pist. Cir.	Sharn.	Chr. Surv.	1872	78° 23′ 46·5″
38° 35′ 13″	...	Br. U. I.	Sk.	Tri.	1874	68° 54′ 53·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
39° 0′ 23″	...	Br. U. I.	Zam.	Tri.	1871	69° 20′ 3·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
39° 4′ 22″	...	Br. U. I.	Zam.	Tri.	1871	69° 24′ 2·5″
38° 59′ 52″	...	Br. U. I.	Zam.	Tri.	1871	69° 19′ 32·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...

Places or Points.	Height in feet.	Observer.	Latitude.	Probable error.
Jergalán (at the bridge)	3,920	L.	...	...
„ picket	6,030	L.	...	...
Jerges village	5,680	L.	...	...
„ river where it issues from the mountains	8,160	L.	...	...
„ pass	11,320	L.	...	...
Jeri postal station	1,950	S.	...	...
Jeriuta river	6,040	L.	...	...
Jid-Arik picket	4,200	L.	...	...
Jil Tegerman	16,000	Bun.	...	...
Jin-Jin river	2,280	L.	...	...
„ -Ho town	1,260	S.	...	...
„ „ fort	1,230	She.	...	...
„ „ village at the ford over the Jin river	1,120	L.	...	...
Jirgilti river where it issues from the pass	3,350	L.	...	...
Jiri-Krut, name of two peaks on the river of the same name.	15,000 15,100	S.	...	...
Jirimta river	4,241	She.	...	...
„ „	7,820	She.	...	...
Jitim-Bel pass	12,450	K.	...	...
Jiti-Uguz bridge	5,840	L.	...	...
Jizák town	970	Sharn.	...	...
„ mountain (stone on the)	...	...	40° 6′ 31·2″	...
„ northern barbette of the powder magazine	...	...	40° 7′ 7·5″	± 0·31″
„ Pole	...	...	40° 7′ 13·2″	...
„ Fort	...	...	40° 9′ 36″	...
Jizmán, on the slopes	2,870	...	...	...
„ summit	4,080	...	...	...
„ village	2,040	...	...	...
Jon-Jakar summit	4,220	A.	...	...
Juka	6,240	K.	...	...
„ pass	11,660	K.	...	...
Julek Fort	...	...	44° 16′ 54″	...
Julpas (the tomb of)	...	...	46° 41′ 32″	...
Jus-Agach picket	...	...	46° 55′ 50″	...
Jus-Bulák Fort, Pyramid X	...	...	41° 10′ 59·9″	...
K				
Kabak, a tomb at the southern end of Lake Ala-Kul	...	...	45° 45′ 8″	...
Káfirnihán, town in Hissár	2,330	Schv.	...	...
Kainár hamlet	2,690	Schv.	...	...
Kájerága pass	10,940	A.	...	...
Kakaiti pass	490	Schv.	...	...
„ caravanserai	...	...	37° 35′ 29″	...
Kalende-Karsák, Pole R.	...	...	40° 54′ 52·3″	...
Kal-Shádi hamlet	2,200	Schv.	...	...
Kálta-Minár pass	2,230	Schv.	...	...
Kamak-Chakán, Pyramid H.	...	...	41° 26′ 2″	...
Kamennei-Most (stone bridge) Fort (western barbette)	2,280	She.	39° 45′ 52·3″	± 2·10″

and points in Turkistán, &c.—continued.

Longitude east of Pulkoff.	Probable error.	Instrument.	Observer.	How obtained.	Year.	Longitude east of Greenwich.
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
37° 27′ 53″	...	Br. U. I.	Sk.	Tri.	1874	67° 47′ 33·5″
37° 30′ 9″	± 2·19″	Reps. V. C.	Sharn.	Chr. Surv.	1871	67° 49′ 49·5″
37° 29′ 26″	...	Br. U. I.	Sk.	Tri.	1874	67° 49′ 6·5″
37° 28′ 22″	...	...	Str.	Astr. D.	1865	67° 48′ 4·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
36° 3′ 36″	...	...	But.	Astr. D.	1863	66° 23′ 16·5″
31° 26′ 44″	...	...	...	Astr. D.	1846	61° 46′ 24·5″
49° 14′ 20″	...	...	...	Astr. D.	1862-65	79° 34′ 0·5″
38° 55′ 17″	...	Br. U. I.	Sir.	Tri.	1872	69° 14′ 5·5″
51° 47′ 47″	...	...	...	Astr. D.	1862-65	82° 27·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
37° 13′ 22″	...	Pist, Cir.	Schv.	Chr. Surv.	1875	67° 33′ 2·5″
38° 35′ 12″	...	Br. U. I.	Zam.	Tri.	1871	68° 54′ 52·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
38° 57′ 26″	...	...	{ Rod. Sir. }	...	1870-72	69° 17′ 0·65″
37° 1′ 52″	± 2·88″	Reps. V. C.	Sharn.	Chr. Surv.	1871	67° 21′ 3·25″

Alphabetical List of some of the places

Places or Points.	Height in feet.	Observer.	Latitude.	Probable error.
Kamennei-Most (postal station) .	2,380	She.	39° 45′ 41·5″	±1·10″
Kánish-Kurgán	1,590	M.	39° 45′ 43·5″	...
,, ,, a ruined fort on the Sir-Daria.	...	...	44° 52′ 1″	...
Kámishli-Básh lake . . .	...	...	46° 14′ 54″	...
Kánabát	1,348	Z.	...	...
,, Pyramid Az. . .	...	...	41° 14′ 1·8″	...
Kandik-Tapa Pyramid . . .	...	...	39° 31′ 56·3″	...
Kángur hamlet	2,130	Schv.	...	...
Kán-Jugán fort on the road to Káshgár	6,820	Kur.	...	...
Kánka-Tapa	1,012	Z.	...	...
,, Pyramid Pz. . .	...	...	40° 48′ 16·7″	...
Kapál town	3,900	S.	...	...
,, (church at)	...	...	45° 8′ 12″	...
,, ...	...	...	45° 7′ 48″	...
,, ...	...	...	45° 7′ 45″	...
Kapkak, junction of the river of that name with the Káshka-Tur . .	9,030	L.	...	...
Kapkak pass	11,170	L.	...	...
,, entrance into the pass .	6,790	L.	...	...
Kaplán-Kul lake	5,560	M.	...	...
,, ,, pass	6,930	M.	...	...
Kapsalán river	5,300	L.	...	...
Káptagai, ancient Chinese picket .	4,360	L.	...	...
Kára-Agách (village of) . . .	...	...	40° 3′ 18″	...
Kárabág hamlet	1,340	Schv.	...	...
Kárabálti, postal station . .	2,730	S.	...	...
Kára-Bel pass	9,160	K.	...	...
Kára-Chekin, postal station . .	3,395	S.	...	...
,, -Chulluk, hamlet . . .	1,510	Schv.	...	...
Karách	1,231	Z.	...	...
,, Pyramid Zz. . . .	...	...	40° 53′ 25·8″	...
Kára-Daria Pyramid . . .	...	...	39° 35′ 45·2″	...
Kárakázik (southern) river which enters the Kok-Su . . .	10,450	M.	...	...
Kárakázik pass	14,410	M.	...	...
Kára-Khoval	3,080	Schv.	...	...
Kárakol picket	...	...	47° 26′ 36″	...
,, town	5,520	L.	...	...
,, ,, ...	5,430	K.	...	...
,, (church at) . . .	...	...	42° 27′ 40″	±4″
Kára-Kuduk well	...	...	47° 27′ 18″	...
Kára-Kul, descent into the lake .	14,380	M.	...	...
,, Trigonometrical point, $1\frac{1}{3}$ miles from the lake on the bank of River Vasilievka . .	13,190	M.	...	...
,, river where it falls into the lake. . . .	13,140	M.	...	...
,, ...	...	...	40° 53′ 59″	...
,, (camp on a stream which falls into the)	...	...	39° 6′ 40″	...
Káramuk, Greater . . .	7,320	M.	...	...

and points in Turkistán, &c.—continued.

Longitude east of Pulkoff.	Probable error.	Instrument.	Observer.	How obtained.	Year.	Longitude east of Greenwich.
37° 1′ 44″	± 2·31″	Reps. V. C.	Sharn.	Chr. Surv	1871	67° 21′ 24·5″
37° 1′ 58″	...	Br. U. I.	Zal.	Tri.	1874	67° 21′ 38·5″
34° 34′ 34″	...	...	...	Astr. D.	1858	64° 54′ 14·5″
31° 34′ 26″	...	...	...	Astr. D.	1846	61° 54′ 6·5″
...	...	...	...	...	...	...
38° 58′ 23″	...	Br. U. I.	Zam. Sir.	Tri.	1871-72	69° 18′ 03·5″
36° 42′ 54″	...	Br. U. I.	Par.	Tri.	1876	67° 2′ 34·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
38° 39′ 20″	...	Br. U. I.	Zam.	Tri.	1871	68° 59′ 0·5″
...	...	...	...	...	...	...
48° 42′ 57″	...	Tra. Ins.	Bons. Schv.	Astr. D.	1875	79° 2′ 37·5″
48° 41′ 50″	...	...	...	Astr. D.	1862-65	79° 1′ 30·5″
48° 46′ 35″	...	...	...	Astr. D.	1859	79° 6′ 15·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
39° 24′ 6″	...	...	Str.	Astr. D.	1865	69° 43′ 46·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
38° 53′ 24″	...	Br. U. I.	Zam.	Tri.	1871	69° 13′ 4·5″
36° 42′ 19″	...	Br. U. I.	Zal.	Tri.	1874	67° 1′ 59·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
50 47′ 50″	...	...	...	Astr. D.	1862-65	81° 7′ 30·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
48° 6′ 0″	±1′	Pist. Cir.	Sharn.	Chr. Surv.	1872	78° 25′ 40·5″
31° 17′ 37″	...	...	...	Astr. D.	1846	61° 37′ 17·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
41° 20′ 45″	...	Pist. Cir.	Bons.	Chr. Surv.	1875	71° 40′ 25 5″
43° 12′ 58″	...	Pist. Cir.	Bons.	Chr. Surv.	1875	73° 42′ 38·5″
...	...	...	...	...	...	...

PLACES OR POINTS.	Height in feet.	Observer.	Latitude.	Probable error.
Káramuk, Greater (camp on the)	...	...	39° 28′ 42″	...
Karápchi „	...	...	39° 57′ 3·6″	...
Kára-Su (postal station on the road to Khojand)	1,050	M.	...	...
„ (postal station)	2,190	S.	...	...
„ „	1,750	...	...	...
„ Pyramid	...	...	39° 48′ 35·7″	...
Kára-Tágh, town of	2,160	Schv.	...	...
„ house of the Yesaul-Báshi	...	...	38° 36′ 41″ 39° 44′ 53·5″	...
Kára-Tásh-Aulie, Pole K.	...	...	40° 56′ 57·4″	...
Kára-Tapa hamlet	2,920	Schv.	...	...
„ „	2,910	...	...	...
Kára-Tapa, Pole C.	...	...	41° 5′ 17·8″	...
„ Pyramid	...	...	40° 7′ 10·5″	...
Káragáti river	5,760	L.	...	...
Kárkára river opposite the road across the Sartike-Jel pass	7,470	L.	...	...
Kárkára at its junction with the Kegen	5,800	...	...	...
Kárkára and Kegen, junction of the rivers	...	...	43° 1′ 33″	...
Károván-Kul pass	7,390	M.	...	...
Kárshi town	820	Schv.	...	...
„ house of the Diván-Begi	...	...	38° 52′ 13″	...
Kásh, warm spring, 2⅔ miles from the village of Mazár	2,640	L.	...	...
Kásh river	9,896	She.	...	...
„ village	2,540	L.	...	...
„ fort	...	...	43° 38′ 4·9″	±1·70″
Káshgár town	4,020	R.	...	...
„ centre of the town	...	...	39° 27′ 42″	±4″
Kástaresh	3,800	...	...	...
Kástek fort	3,550	S.	43° 8′ 0″	...
„ „	3,300	...	...	...
„ pass (entrance to)	4,020	R.	...	...
Kátti-Kurgán town	1,370	...	...	...
„ „ house in the Amir's garden	...	...	39° 53′ 30″	...
Kauli	1,326	Z.	...	...
„ Pyramid L.	...	...	40° 40′ 10·9″	...
Kazála, Commandant's house	...	...	45° 45′ 26·6″	...
Kazán-Terek Pyramid	...	...	39° 58′ 50·1″	...
Kazárt pass	8,090	K.	...	...
Kazgán-Tapa Pyramid	...	...	40° 6′ 47·9″	...
Kázik „	10,550	K.	...	...
Kercuchi (fort)	...	...	40° 53′ 54″	...
„ Pole G.	...	...	40° 53′ 47·5″	...
Keskelen defile	10,800	...	...	...
Khadik river, junction with the Narat	9,760	L.	...	...
„ „ at its junction with the River Sarmin	7,810	L.	...	...
Khadik river at its junction with the Sakhim-Toga	7,530	L.	...	...

and points in Turkistán, &c., —continued.

Longitude east of Pulkoff.	Probable error.	Instrument.	Observer.	How obtained.	Year.	Longitude east of Greenwich.
41° 29′ 12″	...	Pist. Cir.	Bons.	Chr. Surv.	1876	71° 48′ 52·5″
38° 7′ 19″	...	Br. U. I.	Sk.	Tri.	1874	...
...	...	...	...	...	...	68° 26′ 59·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
36° 17′ 8″	...	Br. U. I.	Par.	...	1876	66° 36′ 48·5″
...	...	...	...	...	...	...
{ 38° 1′ 43″ { 37° 3′ 50″	} ...	...	Schv.	Chr. Surv.	1875	68° 21′ 23·5″
39° 7′ 19″	...	Br. U. I.	Zam.	Tri.	1871	67° 20′ 30·5″
...	...	...	...	...	...	69° 26′ 59·5″
...	...	...	...	...	...	...
38° 58′ 26″	...	Br. U. I.	Zam.	Tri.	1871	69° 18′ 06·5″
38° 8′ 32″	...	Br. U. I.	Sk.	Tri.	1874	68° 28′ 12·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
48° 46′ 50″	...	...	...	Astr. D.	1859	79° 6′ 30·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
35° 27′ 22″	...	Pist. Cir.	Schv.	Chr. Surv.	1875	65° 47′ 02·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
51° 34′ 52″	±7·6″	Pist. Cir.	Bons.	Chr. Surv.	1873	81° 54′ 32·5″
...	...	...	...	...	...	...
45° 41′ 48″	±1′	Pist. Cir.	Sharn.	Chr. Surv.	1872	76° 1′ 28·5″
...	...	...	...	...	...	...
45° 40′ 20″	...	...	...	Astr. D.	1859	76° 0′ 0·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
35° 54′ 58″	...	...	Str.	Astr. D.	1869	66° 14′ 38·5″
...	...	...	...	...	...	69° 19′ 54·5″
39° 0′ 14″	...	Br. U. I.	Zam.	Tri.	1871	...
31° 47′ 15″	...	Reps. V.C.	...	Chr. Surv.	1869	62° 06′ 55·5″
38° 48′ 31″	...	Br. U. I.	Sk.	Tri.	1874	69° 08′ 11·5″
...	...	...	...	...	...	...
37° 39′ 53″	...	Br. U. I.	Sk.	Tri.	1874	67° 59′ 33·5″
...	...	...	...	...	...	...
39° 9′ 0″	...	Br. U. I.	Str.	Astr. D.	1865	69° 28′ 40·5″
39° 7′ 51″	...	...	Zam.	Tri.	1871	...
...	...	...	...	...	...	69° 27′ 31·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...

Alphabetical List of some of the places

Places or Points.	Height in feet.	Observer.	Latitude.	Probable error.
Khadik river where it falls into a marsh on the Yulduz . . .	7,980	...	...	...
Khadnurach where it descends into Northern Borogobásun . .	5,570	S.	...	...
Khajazuk village . . .	3,200	...	...	...
Khargol mountain . . .	5,207	She.	...	...
Kharsal river, not far from the marsh	7,980	L.	...	...
Khavuátak Pyramid . . .	...	...	40° 2′ 55·8″	...
Khishkat summit above the pass .	12,500	S.	...	...
„ pass	10,700	S.	...	...
Khish-Kupruk, postal station .	1,700	S.	...	...
Khishrau Pyramid . . .	...	...	39° 40′ 2·5″	...
Khitai (village of), Pole N. . .	...	...	40° 5′ 46·6″	...
Khit-Imám (mosque of), Pole N .	...	...	41° 20′ 5·9″	...
Khoja-Chilmi-Fara peak . .	14,200	S.	...	...
Khojand town	840	M.	...	...
„	...	...	40° 17′ 0″	...
Khokand town	1,300	M.	40° 31′ 38″	...
Khosh-Bárluk Pyramid . .	...	...	40° 10′ 8·4″	...
Khosur stream	6,270	She.	...	...
Khul-Bágh village . . .	1,020	Schv.	...	...
Khanko-Sála river . . .	7,273	She.	...	...
Khuzár town	1,310	Schv.	38° 36′ 18″	...
Kiákta (well at)	...	...	47° 5′ 45″	...
Kichi-Bulák at its junction with the River Kásh	7,730	L.	...	...
Kiitin river at the ford . .	728	She.	...	...
„ „ at the ruins of the Chinese picket of Chepez . . .	970	L.	...	...
„ „ at the ruins of Meo .	910	She.	...	...
Kindi pass	11,130	K.	...	...
„ „	10,450	Bun.	...	...
Kishtut mountain . . .	12,500	S.	...	...
„ pass	11,640	A.	...	..
Kitáb town	1,800	Schv.	...	...
Kitai picket (Chinese picket) on the River Kunges	4,530	L.	...	...
Kizili, Pyramid H. . . .	...	...	40° 5′ 16·1″	...
Kizil-Inge spring . . .	8,680	L.	...	...
„ Jár pass across the Alai range	8,370	M.	...	...
„ Kiya pass	7,000	M.	...	...
„ Kotal pass	3,150	L.	...	...
„ Kurgán	5,540	M.	40° 10′ 54″	...
„ Ob (Ab)	9,290	M.	...	...
„ pass across the Trans-Alai range	14,020	M.	...	...
„ Su village	5,790	L.	...	...
Kizil-Sumbe on the left bank of the Borotola	...	...	44° 58′ 59·7″	±0·61″
„ Yárt river	11,310	M.	...	...
„ „ camp on the river .	...	...	39° 32′ 13″	...
Kiz-Sigen	994	Z.	...	...
„ Pyramid A. . . .	...	...	40° 39′ 27·4″	...

and points in Turkistán, &c.—continued.

Longitude east of Pulkoff.	Probable error.	Instrument.	Observer.	How obtained.	Year.	Longitude east of Greenwich.
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
38° 31′ 12″	...	Br. U. I.	Sk.	Tri.	1874	68° 50′ 52·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
36° 32′ 19″	...	Br. U. I.	Par.	Tri.	1876	66° 51′ 59·5″
39° 5′ 50″	...	Br. U. I.	Rud.	Tri.	1873	69° 25′ 30·5″
38° 54′ 32″	...	Br. U. I.	Sir.	Tri.	1872	69° 14′ 12·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
39° 17′ 18″	...	...	Str.	Astr. D.	1865	69° 36′ 58·5″
40° 37′ 18″	...	...	Str.	Astr. D.	1870	70° 56′ 58·5″
37° 32′ 22″	...	Br. U. I.	Sk.	Tri.	1874	67° 52′ 02·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
35° 53′ 15″	...	Pist. C.	Schv.	Chr. Surv.	1875	66° 12′ 55·5″
32° 10′ 23″	...	...	...	Astr. D.	1846	62° 30′ 07·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
38° 53′ 34″	...	Br. U. I.	Rud. Sk.	Tri.	1873-74	69° 13′ 14·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
43° 10′ 9″	...	Pist. Cir.	Bons.	Chr. Surv.	1876	73° 29′ 49·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
50° 52′ 19″	±14·5″	Pist. Cir.	Bons.	Chr. Surv.	1873	81° 11′ 59·5″
...	...	...	...	...	...	...
42° 56′ 51″	...	Pist. Cir.	Bons.	Chr. Surv.	1876	73° 16′ 31·5″
...	...	...	...	...	...	...
38° 43′ 29″	...	Br. U. I.	Zam.	Tri.	1871	69° 03′ 09·5″

Places or Points.	Height in feet.	Observer.	Latitude.	Probable error.
Kluchivóe	...	...	40° 6′ 37″	...
„ Pole	...	...	40° 6′ 49·2″	...
Kobádián, town in Hissár	460	Schv.	...	...
„ Beg's house	...	...	37° 24′ 27″	...
Kochkura ford	6,040	Bun.	...	...
„ „	6,050	R.	...	...
Kogárt pass	10,520	Bun.	...	...
Koibin, postal station	3,293	S.	...	...
Kok-Jár, near the salt mines	9,220	L.	...	...
„ Mainak picket	5,000	L.	...	...
„ Sai river	2,360	L.	...	...
„ Su river	8,500	M.	...	...
„ „ pass	10,580	L.	...	...
„ „ in the former Chinese golden administration	7,580	L.	...	...
„ „ river at the bridge, near its exit from the mountains	4,330	L.	...	...
„ „ village	4,000	...	...	...
Kok-Su settlement	...	...	44° 39′ 7″	...
Kok-Tsikár spring	7,630	L.	...	...
Konbun river	4,970	L.	...	...
Konstantinoff, postal station on the River Chu	2,130	S.	...	...
Konur-Ulen, postal station	4,261	S.	...	...
Kos-Aral, ancient fort at the mouth of the Sir-Daria	...	...	46° 1′ 18″	...
Koshál-Khoja mountain	13,100	S.	...	...
Kosh-Tapa	1,110	Z.	...	...
„ „ Pyramid Nz.	...	...	40° 50′ 16″	...
Kotil pass	9,820	L.	...	...
Kotla-Sára river	8,868	S.	...	...
„ boundary of the fir woods	8,110	L.	...	...
„ at the ford	7,980	L.	...	...
Koyánchi (village of), Pyramid	...	...	39° 44′ 16·6″	...
Krul	9,072	S.	...	...
Kubergende pass	12,400	K.	...	...
Kucha-Malik	...	...	39° 40′ 10·8″	...
Kuh-i-Safed mountain	13,900	S.	...	...
Kuiluk pass	13,570	K.	...	...
Kulán-Yádza, ruins of the Chinese picket at the marsh of Ebi-Nor	840	L.	...	...
Kul-Ab town	1,210	Schv.	...	...
Kul-Bási mountain	7,110	...	...	...
Kulenka-Tugai (camp of), near Sufi-Kurgán	...	...	40° 1′ 32″	...
Kuliáb, Beg's house	...	...	37° 54′ 37″	...
Kulja town	2,265	S.	...	...
„ „	2,230	L.	...	...
„ „	2,210	L.	...	...
„ „	1,700	...	43° 55′ 53″	...
Kul-Kalan lake	9,229	A.	...	...
„ „ „	9,200	...	...	...
„ „ pass	11,900	...	...	...
Kul-Kuduk (well at)	...	...	46° 57′ 41″	...

and points in Turkistán, &c.—continued.

Longitude east of Pulkoff.	Probable error.	Instrument.	Observer.	How obtained.	Year.	Longitude east of Greenwich.
37° 28′ 20″	...	...	Str.	Astr. D.	1869	67° 48′ 0·5″
37° 29′ 53″	...	Br. U. I.	Sk.	Tri.	1874	67° 49′ 33·5″
...	...	...	...	...	...	...
37° 53′ 14″	...	Pist. Cir.	Schv.	Chr. Surv.	1875	68° 12′ 54·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
48° 38′ 35″	...	...	...	Astr. D.	1859	78° 58′ 15·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
30° 44′ 0″	...	...	...	Astr. D.	1855	61° 03′ 40·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
38° 47′ 31″	...	Br. U. I.	Zam.	Tri.	1871	69° 07′ 11·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
36° 50′ 51″	...	Br. U. I.	Zal.	Tri.	1874	67° 10′ 31·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
36° 17′ 21″	...	Br. U. I.	Par.	Tri.	1876	66° 37′ 01·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
43° 11′ 2″	...	Pist. Cir.	Bons.	Chr. Surv.	1876	73° 30′ 42·5″
39° 27′ 20″	...	Pist. Cir.	Schv.	Chr. Surv.	1875	69° 47′ 00·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
50° 36′ 35″	...	...	...	Astr. D.	1859	80° 56′ 15·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
31° 18′ 22″	...	...	...	Astr. D.	1846	61° 38′ 02·5″

Alphabetical List of some of the places

Places or Points.	Height in feet.	Observer.	Latitude.	Probable error.
Kum town	5,260	...	...	...
„ Arik, postal station	2,850	S.	...	...
Kumirch, point on the river between the two Chinese pickets	...	...	46° 59′ 11″	...
Kum-Suát	...	...	44° 39′ 12″	...
Kunika-Tapa Pyramid	...	...	39° 59′ 52·7″	...
Kungei-Ak-Su (bridge at the village of)	...	...	42° 42′ 42″	±4″
Kurdai, postal station	3,050	S.	...	...
„ pass	3,100	S.	...	...
Kugáncha, Pole No. 2	...	...	40° 3′ 58″	...
„ Pyramid N.	...	...	40° 5′ 16·2″	...
Kurgáu-Tapa town	520	Schv.	...	...
„ garden near the citadel	...	...	37° 50′ 17″	...
Kurgashin-Kháni, rest-house on the road to Káshgár	7,120	Kur.	...	...
Kur-Kára-Usu, ruins of a Dungáu fort	1,640	L.	...	...
Kurkoris mountain, Pyramid R.	...	...	40° 8′ 32·7″	...
Kurmenti defile	10,000	...	...	...
Kurtka, ruins of the fort	6,520	Bun.	...	...
Kurtu-Kunga picket	1,617	She.	...	...
Kushlush hamlet	1,540	Schv.	...	...
Kutemaldi postal station	5,430	L.	...	...
„ river where it falls into Lake Issik-Kul	5,300	...	42° 26′ 22″	±4″
Kutemaldi mouth of the river	...	...	42° 24′ 23″	...
Kutentai, postal station	1,965	S.	...	...
Kuyánkuz, „ „	4,291	S.	...	...
Kuyukh, „ „	2,450	S.	...	...
L				
Lába river	2,520	L.	...	...
Lagmán ford	330	Schv.	...	...
Lailiakán hamlet	1,480	Schv.	...	...
Langár village, not far from Káshgár	3,920	Kur.	...	...
Langir-Ioz village	6,800	A.	...	...
Lepsa-Upper Fort	...	...	45° 31′ 25″	...
Limán (northern end of)	...	...	46° 8′ 42″	...
Lubóvnei-Viselok, postal station	3,040	S.	...	...
M				
Madim	5,160	...	...	...
Madrushkat village	7,000	S.	...	...
Magián defile	6,800	...	...	...
„ village	5,000	...	...	...
Makhrám fort	950	M.	...	...
Makhrám	...	...	40° 15′ 43″	...
Malibásh, postal station	...	...	45° 48′ 11″	...
Malita river	5,210	L.	...	...
Manakeldi pass	9,960	K.	...	...
Manitu (idol temple at)	...	...	46° 29′ 14″	...
Man-Tuluk, source of the River Tsagma in the mountains	3,190	L.	...	...

and points in Turkistán, &c. —continued.

Longitude east of Pulkoff.	Probable error.	Instrument.	Observer.	How obtained.	Year.	Longitude east of Greenwich.
...	...	...	...	...	...	...
...	...	...	...	...	...	...
52° 33′ 35″	...	...	...	Astr. D.	1862-65	82° 53′ 15·5″
35° 32′ 18″	...	...	...	Astr. D.	1863	65° 51′ 58·5″
37° 53′ 36″	...	Br. U. I.	Sk.	Tri.	1874	68° 13′ 16·5″
47° 24′ 30″	±1′	Pist. Cir.	Sharn.	Chr. Surv.	1872	77° 44′ 10·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
38° 0′ 49″	...	Br. U. I.	Sk.	Tri.	1874	68° 20′ 29·5″
37° 59′ 41″	...	Br. U. I.	Sk.	Tri..	1874	68° 19′ 21·5″
...	...	...	...	...	...	...
38° 29′ 25″	...	Pist. Cir.	Schv.	Chr. Surv.	1875	68° 49′ 05·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
38° 49′ 20″	...	Br. U. I.	Rud. Sk.	...	1873-74	69° 9′ 0·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
45° 5′ 36″	±1′	Pist. Cir.	Sharn.	Chr. Surv.	1872	75° 25′ 16·5″
45° 50′ 50″	...	...	...	Astr. D.	1859	76° 10′ 30·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
50° 20′ 50″	...	...	...	Astr. D.	1859	80° 40′ 30·5″
30° 58′ 16″	...	...	...	Astr. D.	1846	61° 17′ 56·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
39° 40′ 15″	...	Pist. Cir.	Bons.	Chr. Surv.	1875	70° 08′ 55·5″
32° 14′ 53″	...	...	...	Astr. D.	1846	62° 34′ 33·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
52° 21′ 50″	...	...	...	Astr. D.	1862	82° 41′ 30·5″
...	...	...	...	...	...	...

Alphabetical List of some of the places

PLACES OR POINTS.	Height in feet.	Observer.	Latitude.	Probable error.
Man-Tuluk river source	8,520	A.	...	...
Mara-Talle hamlet	1,060	M.	...	...
Margilán town	1,480	M.	40° 27′ 55″	...
Mashát, postal station	1,870	S.	...	...
Matimbak spring	2,490	L.	...	...
Mazárka, Pole E.	...	...	41° 2′ 7·3″	...
Mazár village in Borogobasun	2,620	L.	...	...
Merke, postal station	2,560	S.	...	...
„ fort	...	...	42° 52′ 18″	...
Min-Bulák, springs of	...	...	42° 13′ 57″	...
Minku-Tsagán river	6,917	She.	...	...
Min-Tapa Pyramid G.	...	...	40° 23′ 18·8″	...
„ „ „ N.	...	...	40° 52′ 46·5″	...
„ „	1,329	Z.	...	...
Min-Uruk, Táshkand	1,460	Z.	41° 17′ 47″	±0·25″
„ Yul, fort on the road to Káshgár	5,120	Kur.	...	...
Mir-Shádi hamlet	1,150	Schv.	...	...
Mir-Tapa	1,820	M.	...	...
„ Trpa	1,050	Z.	...	...
Mirza-Rabát	2,020	M.	40° 30′ 55·7″	±3·87″
„ „ Pole K.	...	...	40° 58′ 56·6″	...
Mokánchi spring	...	...	46° 46′ 38″	...
Mullushka-Chupan-Ata	...	...	39° 41′ 9·1″	...
Mura pass	12,200	...	...	...
„ „	11,500	...	...	...
„ „	12,100	A.	...	...
Murun-Kuduk (well at)	...	...	46° 46′ 57″	...
Muzárt pass at the junction of the Rivers Muzárt and Saikál	6,740	L.	...	...
„ where detachment is stationed	6,190	L.	...	...
„ (the Lesser) ford at the river on the post road	6,000	L.	...	...
N				
Námangán	...	...	40° 59′ 20″	...
„ (camp at)	...	...	40° 59′ 38″	...
Nán-Tásh river at its junction with the Kok-Jár	8,470	L.	...	...
Narát pass	10,050	L.	...	...
Nárin fort flagstaff	6,770	K.	41° 25′ 48″	±4″
„ „	7,100	Bun.	...	...
„ „ bridge	6,660	R.	...	...
„ height of range on the left bank of the river	12,050 12,500	Bun.	...	...
„ Kol river	8,342	She.	...	...
„ „ village	6,140	L.	...	...
Nau, postal station of	...	...	40° 9′ 16·2″	±1″
„ fort	...	...	40° 9′ 9·6″	...
„ south-easterly chimney of the post office	...	...	40° 8′ 55·6″	...
„ Pyramid G.N.	...	...	40° 7′ 59·5″	...
„ „ L.N.	...	...	40° 8′ 39·2″	...
Naugandi Pyramid L.	...	...	40° 2′ 36·8″	...

and points in Turkistán, &c.—continued.

Longitude east of Pulkoff.	Probable error.	Instrument.	Observer.	How obtained.	Year.	Longitude east of Greenwich.
...	...	...	...	...	...	...
...	...	...	...	...	...	...
41° 23′ 12″	...	Br. U. I.	Str.	Astr. D.	1870	71° 42′ 52·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
39° 2′ 45″	...	Br. U. I.	Zam.	Tri.	1871	69° 22′ 25·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
42° 49′ 18″	...	...	Str.	Astr. D.	1865	73° 08′ 58·5″
32° 31′ 9″	...	Pist. Cir.	Sharn.	Chr. Surv.	1871	62° 50′ 49·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
39° 0′ 9″	...	Br. U. I.	Zam.	Tri.	1871	69° 19′ 49·5″
38° 58′ 16″	...	Br. U. I.	Zam.	Tri.	1871	69° 17′ 56·5″
...	...	...	...	...	...	...
38° 57′ 22″	...	Reps. V.C.	Sharn.	Astr. O.	1871	69° 17′ 02·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
38° 2′ 33″	±2·6″	Reps. V. C.	Sharn.	Chr. Surv.	1871	68° 22′ 13·5″
39° 4′ 1″	...	Br. U. I.	Zam.	Tri.	1871	69° 23′ 41·5″
51° 40′ 5″	...	...	...	Astr. D.	1862-65	81° 59′ 45·5″
36° 42′ 15″	...	Br. U. I.	Zal.	Tri.	1874	67° 01′ 55·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
32° 13′ 50″	...	...	...	Astr. D.	1846	62° 33′ 30·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
41° 21′ 24″	...	Br. U. I.	Str.	Astr. D.	1870	72° 32′ 04·5″
41° 17′ 36″	...	Pist. Cir.	Bons.	Chr. Surv.	1875	71° 37′ 16·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
45° 43′ 30″	±1′	Pist. Cir.	Sharn.	Chr. Surv.	1872	76° 03′ 10·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
39° 2′ 39″	±4·30″	Reps. V. C.	...	Chr. Surv.	1873	69° 22′ 19·5″
39° 2′ 30″	...	...	Str.	Astr. D.	1865	69° 22′ 10·5″
39° 2′ 31″	...	Br. U. I.	Rud.	Tri.	1873	69° 22′ 11·5″
38° 59′ 53″	...	Br. U. I.	Rud.	...	1873	69° 19′ 33·5″
39° 4′ 51″	...	Br. U. I.	Rud.	Tri.	1873	69° 24′ 31·5″
38° 44′ 37″	...	Br. U. I.	Sk.	Tri.	1873-74	69° 04′ 17·5″

Alphabetical List of some of the places

PLACES OR POINTS.	Height in feet.	Observer.	Latitude.	Probable error.
Nilka village	3,727	She.	...	...
Niziani Pyramid	...	...	39° 58′ 19·8″	...
Norak hamlet	1,410	She.	...	...
O				
Ogalik village	2,550	...	...	...
Oi-Kain pass	10,510	K.	...	...
Osh town*	3,040	M.	...	...
Osh (Urda)	...	...	40° 32′ 34″	...
Otar, postal station	2,550	S.	...	...
Ottuk (Northern) river	9,390	L.	...	...
„ pass (Turgen-Ak-Su)	12,470	L.	...	...
Ovati pass	7,150	L.	...	...
P				
Pakhut	5,000	...	...	...
Pákshif pass	12,000	S.	...	...
Paldorak fort	7,960	A.	...	...
„ peak opposite the village of the same name	15,000	S.	...	...
„ village	7,960	...	...	...
Panjakand town	3,170	S.	...	...
„ „	3,250	...	...	...
Panjshambe town	1,280	...	...	...
„ Siáb village	2,200	...	...	...
Perovski (fort south-west bastion of)	...	...	44° 50′ 48″	...
Perovski fort	...	...	44° 50′ 46″	...
Peti village	6,000	...	...	...
Pilchin pass	7,230	...	...	...
„ village	2,510	L.	...	...
Pishpek fort	2,130	L.	...	...
„ „	2,470	S.	...	...
Piskand, postal station	1,040	M.	...	...
„ Pole N.	...	...	40° 54′ 58″	...
Pitau hamlet	2,200	Schv.	...	...
Podask mountain	12,200	S.	...	...
Pshágar Pyramid	...	...	39° 57′ 37·5″	...
Pungan, (camp at)	...	...	40° 42′ 36″	...
Pushián, hamlet in Hissár	1,710	Schv.	...	...
R				
Rabát	1,305	Z.	...	...
„ Pyramid	...	...	39° 59′ 54·8″	...
„ Pyramid M.	...	...	40° 46′ 24″	...
Rág, point on the bank of a mountain stream	3,900	...	...	...
Raim peninsula, southern end	...	...	46° 4′ 19″	...
Rarz village	5,080	A.	...	...
Regár town	1,510	Schv.	...	...
Rivamut village	6,300	A.	...	...
Rozi-Abnák village	3,700	A.	...	...
S				
Sai-Kurgán, Pole A.	...	...	41° 9′ 20·3″	...

---

* According to Kuropát

and points in Turkistán, &c.—continued.

Longitude east of Pulkoff.	Probable error.	Instrument.	Observer.	How obtained.	Year.	Longitude east of Greenwich.
...	...	...	...	...	...	...
38° 32′ 30″	...	Br. U. I.	Sk.	Tri.	1874	68° 52′ 10·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
42° 27′ 29″	...	Pist. Cir.	Bons.	Chr. Surv.	1876	72° 47′ 09·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
35° 7′ 54″	...	...	But.	Astr. D.	1863	65° 27′ 3·45″
35° 12′ 10″	...	...	...	Astr. D.	1858	65° 31′ 50·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
39° 0′ 30″	...	Br. U. I.	Zam.	Tri.	1871	69° 20′ 10·5″
...	...	...	...	...	...	...
...	...	...	...	...	..	...
37° 47′ 57″	...	Br. U. I.	Sk.	Tri.	1874	68° 07′ 37·5″
40° 33′ 47″	...	...	Bons.	Chr. Surv.	1875	70° 53′ 27·5″
...		...	...	...	...	...
...	...	...	...	...	...	...
37° 40′ 46″	...	Br. U. I.	Sk.	Tri.	1874	68° 0′ 26·5″
38° 58′ 2″	...	Br. U. I,	Zam.	Tri.	1871	69° 17′ 42·5″
...	...	...	...	...	...	...
31° 27′ 40″	...	...	...	Astr. D.	1855	61° 47′ 20·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
39° 1′ 23″	...	Br. U. I.	Zam.	Tri.	1871	69° 21′ 03·5″

---

kin, 3,050.—*Author.*

Alphabetical List of some of the places

PLACES OR POINTS.	Height in feet.	Observer.	Latitude.	Probable error.
Sairám-Nor	6,660	L.	...	...
Sairám, south-west shore of lake, near a spring	...	...	44° 30′ 22″	±3·06″
Sákhim-Toha river on the road to the town of Kárashár	7,960	L.	...	...
Sakirtma pass	4,200	Schv.	...	...
Sámarkand town	2,150	...	...	...
,, ,,	2,230	...	...	...
,, (Khan's palace)	...	...	39° 39′ 23·6″	±0·59″
,, (Amir's palace)	...	...	39° 38′ 50″	...
San-Chuvánzi, well	1,235	She.	...	...
San-Táshmi water-shed	6,510	L.	...	...
Sapak, (well at)	...	...	46° 28′ 43″	...
Sapash-Takhti fort, Pyramid L.	...	...	41° 16′ 52·8″	...
Sarailik Pyramid	...	...	39° 50′ 35″	...
,, Mount, Pyramid S_2	...	...	39° 52′ 23·6″	...
Sari-Bulák	3,170	L.	...	...
,, Chád river, valley of the Eastern Sirt	11,820	L.	...	...
,, Cheku, a volcano on Khabar	...	...	47° 12′ 44″	...
,, Jáz, picket on the Kastek pass	6,460	R.	...	...
,, ,, river at the Turgen-Ak-Su pass	9,810	K.	...	...
,, Jui, town in Hissár	1,610	Schv.	...	...
,, Kámish defile	1,940	Schv.	...	...
,, Kuchuk fort just before arriving at the Terek-Davan pass	8,060	Kur.	...	...
,, Kul lake	9,860	K.	...	...
,, ,, boundary	2,730	...	...	...
,, Tsogán river	6,540	L.	...	...
,, Yáz at its junction with the Southern Ottuk	8,760	L.	...	...
,, Yáz ford	8,680	L.	...	...
,, Telozoi mountain (summit of)	...	...	47° 22′ 26″	...
Sarmin river where it forms an angle	8,520	L.	...	...
,, pass	11,040	L.	...	...
,, ,, on the Sairám along the road from the ruins of Krul	9,072	S.	...	...
Sartike-Jel pass	11,940	L.	...	...
Sarváda, ancient fort	6,300	...	...	...
Sasse, mountain hamlet	1,705	S.	...	...
Savat, Pyramid No. 1	...	...	39° 59′ 27·5″	...
,, ,, ,, 2	...	...	40° 1′ 7″	...
Sazán-Tugai (natural boundary)	...	...	42° 16′ 24″	...
Selgáti river at the foot of the mountain	8,350	L.	...	...
Sergalli Pyramid	...	...	40° 3′ 8·2″	...
Sergiopol (Bukhin's house at)	...	...	47° 56′ 26″	...
,, (church at)	...	...	47° 56′ 29″	...
Serke-Kuduk No. 3 well	...	...	47° 6′ 30″	...
Sháh-i-Mardán	4,370	M.	...	...
Shamsi gorge entrance	4,720	R.	...	...
,, pass	11,830	Bun.	...	...

and points in Turkistán, &c.—continued.

Longitude east of Pulkoff.	Probable error.	Instrument.	Observer.	How obtained.	Year.	Longitude east of Greenwich.
...	...	...	...	...	...	...
50° 54′ 52″	±11·8″	Pist. Cir.	Bons.	Chr. Surv.	1873	81° 14′ 32·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
36° 38′ 17″	±2·88″	Reps. V.C.	Sharn.	Chr. Surv.	1871	66° 57′ 57·5″
36° 57′ 0″	...	...	Str.	Astr. D.	1869	67° 16′ 40·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
31° 37′ 4″	...	...	...	Astr. D.	1846	61° 56′ 44·5″
38° 46′ 45″	...	Br. U. I.	Str.	Tri.	1872	69° 06′ 25·5″
37° 9′ 48″	...	Br. U. I.	Zal.	Tri.	1874	67° 29′ 28·5″
37° 5′ 11″	...	Br. U. I.	Zal.	Tri.	1874	67° 24′ 51·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
52° 39′ 50″	...	...	...	Astr. D.	1862-65	82° 59′ 30·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
52° 34′ 50″	...	...	...	Astr. D.	1862-65	82° 54′ 30·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
38° 19′ 48″	...	...	...	...	1874	68° 39′ 28·5″
38° 22′ 26″	...	Br. U. I.	Sk.	Tri.	1874	68° 42′ 06·5″
37° 53′ 36″	...	...	But.	Astr. D.	1863	68° 13′ 16·5″
...	...	...	...	...	...	...
38° 4′ 31″	...	Br. U. I.	Sk.	Tri.	1874	68° 24′ 11·5″
50° 1′ 50″	...	...	...	Astr. D.	1862-65	80° 21′ 30·5″
50° 3′ 26″	...	Tra. Ins.	Bons. Schv.	Astr. O.	1875	80° 23′ 06.5″
31° 56′ 19″	...	...	...	Astr. D.	1846	62° 15′ 59·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
..	...	...	...	...	...	...

Alphabetical List of some of the places

Places or Points.	Height in feet.	Observer.	Latitude.	Probable error.
Shamsi pass	12,180	R.	...	...
Shár town	1,800	Schv.	...	...
,, house near the citadel	...	...	39° 3′ 9″	...
Shati defile	10,300	...	...	...
Shaugas pass	7,980	M.	...	...
Shikho village	1,540	She.	...	...
,, ,,	1,270	L.	...	...
Shir-Abád, town in Hissár	920	Schv.	...	...
Shirábád	...	...	37° 40′ 36″	...
Shumukai, Pole R.	...	...	40° 49′ 3·3″	...
Shur-Bulák pass on the road to Káshgar	8,660	Kur.	...	...
Shurshu	1,123	Z.	...	...
Shur-Shu, Pyramid D.	...	...	40° 37′ 17·4″	...
Sigoshur-Kho, village	2,025	She.	...	...
Silbur	390	She.	...	...
Silka spring, on the road leading to the foot of the Ala-Tau mountains	4,210	L.	...	...
Sipánchuk	...	...	40° 4′ 51·3″	...
Sir-Ab hamlet	2,790	She.	...	...
Sir-Daria river, junction with the Liman	...	...	46° 3′ 32″	...
Sir-Daria, Pyramid at the mouth of the Aral Sea	...	...	46° 3′ 23″	...
Son-Kul lake	9,400	Bun.	...	..
Sor-Kuduk Pyramid	...	...	40° 6′ 16·5″	...
,, (well at)	...	...	46° 18′ 33″	...
Sufarak ridge	6,560	A.	...	...
Sufi-Kurgán*	6,570	M.	...	...
Sugáti, postal station	2,470	S.	...	...
Suidun town	2,128	S.	...	...
,, ,,	1,330	L.	...	...
Suiok pass	12,740	Bun.	...	...
Suiok-Tapa pass	8,000	...	...	...
Sumbe, Buddhist monastery	7,000	...	43° 1′ 32″	...
Surte pass, 2⅔ miles from Sirta	6,564	S.	...	...
Surt Pyramid	...	...	39° 47 24″	...
T				
Tabilje river where it issues from the mountains	4,280	L.	...	...
Tabulgáti gorge	9,000	...	...	...
Tagir-Sai river	790	Schv.	...	...
Takhta-Karácha pass	5,180	Schv.	...	...
Takiyánza	1,663	S.	...	...
Takmálik pass	9,150	K.	...	...
Takobai, (well at)	...	...	46° 54′ 7″	...
Talbogut	...	...	46° 0 30″	...
Taldi-Bulák picket	6,460	L.	...	...
Talik	3,763	S.	...	...
Talishkán hamlet	660	Schv.	...	...
Talki, entrance to the defile	3,740	L.	...	...
,, pass	6,990	L.	...	...
Talmazár hamlet	1,750	M.	...	...

---

* According to Kuropát

and points in Turkistán, &c.—continued.

Longitude east of Pulkoff.	Probable error.	Instrument.	Observer.	How obtained.	Year.	Longitude east of Greenwich.
...	...	...	...	...	...	...
...	...	...	...	...	...	...
36° 29′ 19″	...	Pist. Cir.	Schv.	Chr. Surv.	1875	66° 48′ 59·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
36° 43′ 0″	...	Pist. Cir.	Schv.	Chr. Surv.	1875	66° 62′ 40·5″
38° 58′ 21″	...	Br. U. I.	Zam.	Tri.	1871	69° 18′ 01·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
38° 55′ 2″	...	Br. U. I.	Zam.	Tri.	1871	69° 14′ 42·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
37° 33′ 45″	...	Br. U. I.	Sk.	Tri.	1874	67° 63′ 25·5″
...	...	...	...	...	...	...
30° 58′ 35″	...	...	...	Astr. D.	1846	61° 18′ 15·5″
30° 46′ 42″	...	...	...	Astr. D.	1846	61° 06′ 22·5″
...	...	...	...	...	...	...
37 45′ 26″	...	Br. U. I.	Sk.	Tri.	1874	68° 05′ 06·5″
32° 9′ 44″	...	...	...	Astr. D.	1846	62° 29′ 24·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
50° 4′ 50″	...	...	...	Astr. D.	1859	80° 24′ 30·5″
...	...	...	...	...	...	...
36° 57′ 1″	...	Br. U. I.	Zal.	Tri.	1874	67° 16′ 41·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
32° 13′ 43″	...	...	...	Astr. D.	1846	62° 33′ 23·5″
31° 27′ 4″	...	...	...	Astr. D.	1846	61° 46′ 44·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...

---

kin, 6,470.—*Author.*

PLACES OR POINTS.	Height in feet.	Observer.	Latitude.	Probable error.
Talpas-Tapa (centre of)	...	...	40° 9′ 30·9″	...
Támdi, warm spring at	...	...	41° 45′ 6″	...
Targap, postal station	2,600	S.	...	...
Tarnásh, Pyramid N.	...	...	41° 16′ 3·5″	...
Tarnát	1,477	Z.	...	...
Tarti, postal station	2,550	S.	...	...
Tás-Asu pass	10,700	Bun.	...	...
Táshkand	1,410	...	...	...
„ (barbette of the Russian fort at Pyramid B.	...	...	41° 18′ 29·9″	...
Táshkand observatory	...	...	41° 19′ 32·9″	±0·16″
„ town	...	...	41° 18 42″	...
„ „	...	...	41° 18′ 40·5″	...
Tásh-Ui on the further side of the Terek-Dávan pass	10,170	Kur.	...	...
Tásh-Rabát pass	12,000	Bun.	...	...
„ into Bukháran territory	2,590	Schv.	...	...
„ Sai river	1,280	Schv.	...	...
„ Tapa	2,820	L.	...	...
Tavushin ridge on the road to the village of that name	7,800	A.	...	...
„ peak over the same village	14,500	S.	...	...
Taz-Tágh mountain	11,800	S.	...	...
Tech (Northern) river	9,150	A.	...	...
„ pass	13,170	L.	...	...
Teishik-Tapa Pyramid	...	...	40° 3′ 18·3″	...
Tekes river at its junction with the Kunges	2,720	L.	...	...
„ ferry across the river at its exit from the mountains	3,070	L.	...	...
„ river at its junction with the Muzárt	5,500	L.	42° 54′ 31″	...
„ river at its junction with the Jerinta	5,100	L.	...	...
Tekes, mouth of the river	...	...	43° 34′ 49·4″	±1·74″
Temir-Kabuk (well at)	...	...	40° 43′ 1″	...
Tenga-Khoval, Kirghiz winter quarters	2,300	Schv.	...	...
Terek-Bel pass	10,640	K.	...	...
„ Daván pass	12,700	Kur.	...	...
Terekli No. 1 well	...	...	47° 44′ 39″	...
„ „ 2 „	...	...	47° 41′ 22″	...
Ters, postal station	3,150	S.	...	...
Tilyau	2,260	M.	...	...
Tobilte stream	4,390	She.	...	...
Togai Pyramid	...	...	39° 35′ 30·9″	...
Togur-Su river at its junction with a small stream	5,750	L.	...	...
Toguz-Toran	4,250	Bun.	...	...
Toi-Tapa, Pole D.	...	...	41° 2′ 22·6″	...
Tokáchi	936	Z.	...	...
„ Pyramid K.	...	...	40° 15′ 47·1″	...

and points in Turkistán, &c.—continued.

Longitude east of Pulkoff.	Probable error.	Instrument.	Observer.	How obtained.	Year.	Longitude east of Greenwich.
38° 35′ 33″	...	Br. U. I.	Sk.	Tri.	1874	68° 55′ 13·5″
34° 17′ 29″	...	Pist. Cir.	Sharn.	Chr. Surv.	1871	64° 37′ 09·5″
...	...	...	...	...	...	
39° 2′ 26″	...	Br. U. I.	Rod. Zam.	Tri.	1870-71	69° 41′ 46·5″
...	...	...	...	...	...	
...	...	...	...	...	...	
...	...	...	...	...	...	
...	...	...	...	...	...	
38° 55′ 49″	...	Br. U. I.	Sir.	Tri.	1872	69° 15′ 29·5″
38° 57′ 58·8″	...	Tra. Ins.	Bons. Sharn.	Astr. D.	1873-74	69° 17′ 39·3″
38° 56′ 48″	...	...	Str.	Astr. D.	1865	69° 16′ 28·5″
38° 56′ 18″	...	...	...	...	...	69° 15′ 58·5″
...	...	...	...	...	...	
...	...	...	...	...	...	
...	...	...	...	...	...	
...	...	...	...	...	...	
...	...	...	...	...	...	
...	...	...	...	...	...	
...	...	...	...	...	...	
...	...	...	...	...	...	
...	...	...	...	...	...	
...	...	...	...	...	...	
37° 51′ 28″	...	Br. U. I.	Sk.	Tri.	1874	68° 11′ 08·5″
...	...	...	...	...	...	
...	...	...	...	...	...	
50° 9′ 50″	...	...	...	Astr. D.	1859	80° 29′ 30·5
...	...	...	...	...	...	
52° 8′ 55″	±6·6″	Pist. Cir.	Bons.	Chr. Surv.	1873	82° 28′ 35
36° 5′ 14″	...	Pist. Cir.	Sharn.	Chr. Surv.	1871	66° 24′ 54
...	...	...	...	...	...	
...	...	...	...	...	...	
...	...	...	...	...	...	
31° 5′ 50″	...	...	...	Astr. D.	1846	61° 25′ 30·5″
31° 10′ 37″	...	...	...	Astr. D.	1846	61° 30′ 17·5″
...	...	...	...	...	...	
...	...	...	...	...	...	
...	...	...	...	...	...	
36° 51′ 16″	...	Br. U. I.	Zal.	Tri.	1874	67° 10′ 56·5″
...	...	...	...	...	...	
...	...	...	...	...	...	
39° 0′ 3″	...	Br. U. I.	Zam.	Tri.	1871	69° 19′ 43·5″
...	...	...	...	...	...	
38° 53′ 13″	...	Br. U. I.	Rod.	Tri.	1871-73	69° 12′ 53·5″

PLACES OR POINTS.	Height in feet.	Observer.	Latitude.	Probable error.
Tok-Fán, mountain by a village of the same name	14,300	S.	...	...
Tokhta (idol temple at) . . .	...	...	45° 25′ 17″	...
Tokhtu-Khun, ruins at Tabun-Kára-gách	2,402	S.	...	...
Tokmák town	2,240	L.	42° 50′ 24″	...
„ (southern barbette of the fort at)	...	...	42° 51′ 14″	±4″
Tok-Sur pass	6,050	L.	...	...
Tsárítsin picket on the right bank of the River Kok-Su . . .	...	...	44° 38′ 10″	...
Tsagán-Usu (Ak-Su river where it joins the Yulduz marsh) .	7,920	L.	...	...
„ („ „ in the mountains) .	8,140	L.	...	...
Tsagma river opposite the Ungut pass . . .	6,310	L.	...	...
„ „ mouth of . .	2,620	L.	...	...
Tsatsi river	4,520	L.	...	...
Tsiteti pass	7,928	S.	...	...
„ „	7,590	L.	...	...
Tube	...	...	47° 16′ 46″	...
Tulku-Básh, postal station . .	2,620	S.	42° 43′ 44″	±4″
Tup river (mouth of, at Lake Issik-Kul)	5,300	..	42° 42′ 42″	...
„ village on Lake Issik-Kul .	5,340	Schv.	...	...
Turaigir pass	6,600	...	...	...
„ „	7,500	...	...	...
Turgen „	9,400	...	...	...
„ Ak-Su river at its junction with the Ashu-Tur . . .	9,020	L.	...	...
Turgun, tributary of the Kunges where it issues from the mountains.	3,410	L.	...	...
Turkistán Mount	...	...	43° 17′ 36″	...
Turpak-Atlish pass . . .	1,670	Schv.	...	...
U				
Uata village	5,900	S.	...	...
Uch-Agách	5,560	M.	...	...
„ Bulák, postal station . .	2,260	S.	...	...
Uch-Kayuk	...	...	43° 13′ 36″	...
„ left bank of the Sir-Daria opposite the ruins of Fort Kok-Su . .	...	...	43° 14′ 12″	...
„ Kul river at its junction with the Sari-Jaz . . .	7,880	L.	...	...
„ Kul river at its junction with the Sari-Jaz . . .	8,190	L.	...	...
„ Kul river at its junction with the Sari-Jaz . . .	8,990	...	...	...
„ Kul river at its junction with the river Ichegarta . .	9,570	...	...	...
„ Kurgán	2,970	M.	...	...

and points in Turkistán, &c.—continued.

Longitude east of Pulkoff.	Probable error.	Instrument.	Observer.	How obtained.	Year.	Longitude east of Greenwich.
...	...	...	...	...	...	...
51° 52′ 44″	...	...	...	Astr. D.	1862	82° 12′ 24·5″
...	...	...	...	...	...	...
44° 54′ 36″	...	...	Str.	Astr. D.	1865	75° 14′ 16·5″
45° 1′ 48″	±1′	Pist. Cir.	Sharn.	Chr. Surv.	1872	75° 21′ 28·5″
...	...	...	...	...	...	...
48° 23′ 5″	...	...	...	Astr. D.	1862-65	78° 42′ 45·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	
31° 16′ 46″	...	...	...	Astr. D.	1846	61° 36′ 26·5″
48° 4′ 6″	±1′	Pist. Cir.	Sharn.	Chr. Surv.	1872	78° 23′ 46·5″
...	...	...	...	...	...	
...	...	...	...	...	...	...
...	..	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
37° 57′ 18″	...	...	Str.	Astr. D.	1865	68° 16′ 58·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
37° 29′ 48″	...	...	Str.	Astr. D.	1865	67° 49′ 28·5″
37° 28′ 42″	...	...	But.	Astr. D.	1863	67° 48′ 22·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...

Places or Points.	Height in feet.	Observer.	Latitude.	Probable error.
Uch-Kurgán town (mosque in the bazar)	...	...	40° 13′ 58″	...
„ Kurgán Pyramid	...	...	40° 7′ 37·5″	...
„ Tapa, Pole	...	...	40° 12′ 41·4″	...
Uksalir on the road to Káshgár	6,930	Kur.	...	...
Ulastai village on the River Kásh	3,420	L.	...	...
„ river on the nomad road	4,950	L.	...	...
„ „ „ „	4,700	She.	...	...
„ village „ „	3,189	She.	...	...
„ „	3,572	She.	...	...
Ulugchát fort on the road to Káshgár	7,620	Kur.	...	...
Ulus river in the steppe	1,780	...	...	...
Ulva Pyramid	...	...	39° 33′ 29·8″	...
Ungut pass between the Rivers Tekes and Tsagma	6,360	L.	...	...
Ura-Tapa, officers' quarters	...	...	39° 55′ 19·6″	±1·15″
„ Fort	...	...	39° 55′ 18″	...
„ Pyramid	...	...	39° 54′ 49·2″	...
Urázmat „	...	...	40° 2′ 19·4″	...
Urgunt „	...	...	39° 57′ 41·0″	...
Urgut town	3,710	...	...	...
Urjár, mouth of the river	...	...	46° 21′ 35″	...
„ station	...	...	47° 4′ 37″	...
Urmitan fort	4,130	A.	...	...
Urtak, warm spring on the river Urtak	7,820	K.	...	...
„ Sári river	5,350	L.	...	...
„ „ at Tálda	...	...	44° 47′ 3·3″	±2·87″
Urum-Básh pass	9,670	K.	...	...
Ush-Tapa	1,488	Z.	...	...
„ Pyramid P.	...	...	40° 53′ 12·6″	...
Ut-Mek pass	10,300	K.	...	...
Utun, Pole H.	...	...	40° 55′ 53·9″	...
Uyáz Pole	...	...	40° 4′ 50·3″	...
Uz-Bel pass leading to the Pámir	15,190	M.	...	...
„ „ (eastern slopes)	14,290	M.	...	...
Uz-Bel-Su river at its junction with the Chu-Su	13,430	M.	...	...
„ valley to the west of the Uz-Bel pass	14,420	M.	...	...
„ camp on the river	...	...	38° 40′ 21″	...
Uzun-Agach, postal station	2,870	S.	...	...
„ Akhur pass	3,610	Schv.	...	...
V				
Vairnoye town	2,110	L.	...	...
„ „	2,430	...	43° 16′ 30″	...
„ „	2,700	S.	43° 15′ 42″	...
Varu peak to the west of the river of that name	13,700	S.	...	...
Varzi-Minár fort	4,690	...	...	...
Vekhuna Nikla village	3,730	She.	...	...

and points in Turkistán, &c. —continued.

Longitude east of Pulkoff.	Probable error.	Instrument.	Observer.	How obtained.	Year.	Longitude east of Greenwich.
41° 42′ 20″	...	Pist. Cir.	Bons.	Chr. Surv.	1876	72° 02′ 00·5″
38° 30′ 14″	...	Br. U. I.	Sk.	...	1874	68° 49′ 54·5″
37° 34′ 16″	...	Br. U. I.	Sk.	Tri.	1874	67° 53′ 56·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
36° 55′ 11″	...	Br. U. I.	Zal.	Tri.	1874	67° 14′ 51·5″
...	...	...	...	...	...	...
38° 40′ 52″	±6·55″	Reps. V. C.	Bons.	Chr. Surv.	1873	69° 00′ 32·5″
38° 38′ 24″	...	...	Str.	Astr. D.	1865	68° 58′ 04·5″
38° 39′ 52″	...	Br. U. I.	Sk.	Tri.	1874	68° 59′ 32·5″
37° 45′ 36″	...	Br. U. I.	Sk.	Tri.	1874	68° 05′ 16·5″
38° 39′ 14″	...	Br. U. I.	Sk.	Tri.	1874	68° 58′ 54·5″
...	...	...	...	...	...	...
51° 7′ 21″	...	...	...	Astr. D.	1862-65	81° 27′ 01·5″
51° 16′ 2″	...	...	...	Astr. D.	1862-65	81° 35′ 42·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
50° 40′ 16″	±12·0″	Pist. Cir.	Bons.	Chr. Surv.	1873	81° 9′ 56·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
39° 5′ 11″	...	Br. U. I.	Zam.	Tri.	1871	69° 24′ 51·5″
...	...	...	...	...	...	...
39° 9′ 9″	...	Br. U. I.	Zam.	Tri.	1871	69° 28′ 49·5″
37° 56′ 43″	...	Br. U. I.	Sk.	Tri.	1874	68° 16′ 23·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
43° 26′ 11″	...	Pist. Cir.	Bons.	Chr. Surv.	1876	73° 45′ 51·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
46° 33′ 48″	...	...	Str.	Astr. D.	1865	76° 53′ 28·5″
46° 38′ 20″	...	...	...	Astr. D.	1859	76° 58′ 00·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...

Places or Points.	Height in feet.	Observer.	Latitude.	Probable error.
Wádil town (mosque in the bazár)	...	...	40° 10′ 49″	...
„ village in the province of Fargána	2,820	M.	...	...
Washán, below Tágh mountain	12,600	S.	...	...
Y				
Yagnáb river, limit of the cedars on the southern slopes	9,520	A.	...	...
„ „ on the northern slopes	7,147	A.	...	...
Yakdán ridge	6,430	A.	...	...
Yak-Archa pass	3,150	Schv.	...	...
Yak-Tásh and the Kara-Sai (Upper Narin junction of the)	...	...	41° 34′ 19″	±4″
Yám, Pyramid No. 1	...	...	40° 3′ 9·1″	...
„ „ No. 2	...	...	40° 4′ 2·0″	...
Yamáti village, and ferry across the River Ili	2,610	L.	...	...
Yangi-Arik on the road from Gulcha to Terek-Daván	5,320	Kur.	...	...
Yangi-Kand hamlet	1,150	Schv.	...	...
„ Mazár Pyramid	...	...	40° 3′ 49·6″	...
„ Sobák pass	13,280	A.	...	...
„ „ „	13,400	...	...	...
Yangiz-Beg pass	4,530	Schv.	...	...
Yáni-Kurgán town	1,800	...	...	...
„ „ Pyramid	...	...	39° 58′ 4·5″ 40° 6′ 50″	... ...
Fort Yáni-Kurgán, Pyramid K.	...	...	40° 10′ 23·7″	...
Yangi-Shahr Fort (N. W.)	...	...	39° 24′ 17″	±4″
Yarbáshi village	1,160	...	...	...
Yar-Tapa hamlet	1,510	Schv.	...	...
Yaz-Kichu, postal station	2,150	S.	...	...
Yegin on the road to Káshgár	8,260	Kur.	...	...
Yeltu river at its junction with the Kásh river	6,850	L.	...	...
Yukurgen-Kullake	11,430	K.	...	...
Yulduz, western shore of the marsh in the valley of the Greater Yulduz	7,820	L.	...	...
„ southern ditto	7,980	L.	...	...
Yurchi, town in Hissár	1,210	Schv.	...	...
Z				
Zagista where it crosses the road leading to Kareshur	8,420	L.	...	...
„ at the cliff	9,280	L.	...	...
„ mouth of	7,820	L.	...	...
„ pass	11,670	L.	...	...
Zamin Fort	...	...	39° 58′ 6″	...
„ Pole	...	...	39° 57′ 50·2″	...
„ Pyramid	...	...	39° 58′ 38·1″	...
Zaráfshán glacier, end	8,500	A.	...	...
„ „	8,670	...	...	...
„ „	8,850	...	...	...

and points in Turkistán, &c.—continued.

Longitude east of Pulkoff.	Probable error.	Instrument.	Observer.	How obtained.	Year.	Longitude east of Greenwich.
41° 22′ 25″	...	Pist. Cir.	Bons.	Chr. Surv.	1876	71° 42′ 05·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
47° 26′ 0″	±1′	Pist. Cir.	Sharn.	Chr. Surv.	1872	77° 45′ 40·5″
38° 15′ 11″	...	Br. U. I.	Sk.	Tri.	1874	68° 34′ 51·5″
38° 17′ 56″	...	Br. U. I.	Sk.	Tri.	1874	68° 37′ 36·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
38° 25′ 23″	...	Br. U. I.	Sk.	Tri.	1874	68° 45′ 03·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
37° 21′ 4″	...	Br. U. I.	Zal.	Tri.	1874	67° 40′ 44·5″
37° 11′ 50″	...	...	Str.	Astr. D.	1869	67° 31′ 30·5″
38° 59′ 59″	...	Br. U. I.	Rud.	Tri.	1873	69° 19′ 39·5″
45° 45′ 0″	±1″	Pist. Cir.	Sharn.	Chr. Surv.	1872	76° 14′ 40·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...		...	...	...	...
...	...	...	...	...	...	...
...		...	...	...	...	...
	...					
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
38° 2′ 42″	...	...	Str.	Astr. D.	1865	68° 22′ 22·5″
38° 3′ 38″	...	Br. U. I.	Sk.	Tri.	1874	68° 23′ 18·5″
38° 2′ 44″	...	Br. U. I.	Sk.	Tri.	1874	68° 22′ 24·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...

Alphabetical List of some of the places

Places or Points.	Height in feet.	Observer.	Latitude.	Probable error.
Zaráfshán river left bank opposite Fort Urmitan.	4,700	S.	...	...
„ „ „ opposite Dasht-i-Kázi.	5,700	S.	...	...
„ „ „ opposite the village of Shámtich . . .	9,700	S.	...	...
„ (Pyramid) on the banks of the	...	...	39° 34′ 48·5″	...
Zauki exit from the mountains into the valley of the River Zauki .	5,980	L.	...	...
Zaukuchak pass and glacier . .	12,780	L.	...	...
„ river	9,500	L.	...	...
„ at its junction with the River Zauki. . .	6,260	L.	...	...
Zengat (near the village of) Pyramid	...	...	41° 13′ 33·0″	...
Zian-Muzin stream . . .	5,701	She.	...	...
Ziku river	5,144	She.	...	...
Zira-Bulák (memorial at) . .	...	...	39° 54′ 29·1″	...
Ziyangar, Pyramid Sz. . . .	...	...	40° 52′ 31·8″	...

List of points the locality of which is not

Base Pyramid I.	...	...	39° 40′ 56·5″	...
„ „ II.	...	...	39° 42′ 43″	...
East of two villages	...	...	40° 2′ 42·3″	...
Pole Fz.	...	...	41° 0′ 40·6″	...
„ K.	...	...	29° 44′ 53·5″	...
„ M.	...	...	39° 42′ 58·4″	...
„ N.	...	...	39° 41′ 3·4″	...
„ Z.	...	...	39° 34′ 14·2″	...
„ O.	...	...	40° 51′ 35·3″	...
„ No. 3.	...	...	41° 19′ 16·6″	...
Fixed pole	...	...	39° 37′ 59·3″	...
Pole on fort	...	...	39° 59′ 59·8″	...
Mountain pole	...	...	40° 7′ 27·6″	...
Pole on a hill	...	...	39° 56′ 6·0″	...
Red Hill Pole	...	...	39° 47′ 51·3″	...
Pyramid	...	...	39° 47′ 49·1″	...
„ A.	...	...	39° 36′ 6·0″	...
„ A.	...	...	41° 58′ 51·4″	...
„ Ak.	...	...	39° 44′ 0·8″	...
„ A′.	...	...	39° 36′ 9·4″	...
„ A′.	...	...	41° 58′ 51·4″	...
„ B.	...	...	39° 34′ 23·7″	...
„ B.	...	...	39° 36′ 41·9″	...
„ B′.	...	...	42° 1′ 41·1″	...
„ C.	...	...	39° 36′ 34·7″	...

and points in Turkistán, &c. —concluded.

Longitude east of Pulkoff.	Probable error.	Instrument.	Observer.	How obtained.	Year.	Longitude east of Greenwich.
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
36° 55′ 0″	...	Br. U. I.	Zal.	Tri.	1874	67° 14′ 40·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
...	...	...	...	...	...	...
38° 49′ 46″	...	Br. U. I.	Str.	Tri.	1872	69° 09′ 26·5″
...	...	...	...	...	...	...
...	...	...	...	...	...	...
35° 49′ 21″	...	Br. U. I.	Par.	Tri.	1876	66° 09′ 01·5″
38° 28′ 49″	...	Br. U. I.	Zam.	Tri.	1871	68° 48′ 29·5″

fixed by any geographical designation.

36° 46′ 46″	...	Br. U. I.	Zal.	Tri.	1874	67° 06′ 26·5″
36° 46′ 6″	...	Br. U. I.	Zal.	Tri.	1874	67° 05′ 46·5″
37° 25′ 58″	...	Br. U. I.	Sk.	Tri.	1874	67° 45′ 38·5″
39° 5′ 47″	...	Br. U. I.	Zam.	Tri.	1871	69° 25′ 27·5″
37° 3′ 50″	...	Br. U. I.	Zal.	Tri.	1874	67° 23′ 30·5″
37° 5′ 23″	...	Br. U. I.	Zal.	Tri.	1874	67° 25′ 03·5″
36° 55′ 33″	...	Br. U. I.	Zal.	Tri.	1874	67° 15′ 13·5″
36° 49′ 54″	...	Br. U. I.	Zam.	Tri.	1874	67° 09′ 34·5″
38° 44′ 14″	...	Br. U. I.	Zal.	Tri.	1871	69° 03′ 54·5″
38° 54′ 23″	...	Br. U. I.	Sir.	Tri.	1872	69° 14′ 03·5″
36° 58′ 1″	...	Br. U. I.	Zal.	Tri.	1874	67° 17′ 41·5″
37° 15′ 14″	...	Br. U. I.	Zal.	Tri.	1874	67° 34′ 54·5″
37° 20′ 37″	...	Br. U. I.	Zal.	...	1874	67° 40′ 17·5″
37° 16′ 6″	...	Br. U. I.	Zal.	Tri.	1874	67° 35′ 46·5″
36° 59′ 40″	...	Br. U. I.	Zal.	Tri.	1874	67° 19′ 20·5″
36° 52′ 20″	...	Br. U. I.	Zal.	Tri.	1874	67° 12′ 00·5″
36° 34′ 35″	...	Br. U. I.	Par.	...	1876	66° 54′ 15·5″
39° 6′ 16″	...	Br. U. I.	...	...	1870	69° 26′ 56·5″
36° 57′ 22″	...	Br. U. I.	Zal.	Tri.	1874	67° 17′ 02·5″
36° 44′ 7″	...	Br. U. I.	Zal.	Tri.	1874	67° 03′ 47·5″
39° 6′ 16″	...	Br. U. I.	Rod.	Tri.	1870	69° 25′ 56·5″
36° 58′ 35″	...	Br. U. I.	Zal.	...	1874	67° 18′ 15·5″
36° 31′ 8″	...	Br. U. I.	Par.	Tri.	1876	66° 50′ 48·5″
39° 15′ 24″	...	Br. U. I.	Rod.	Tri.	1870	69° 35′ 04·5″
36° 27′ 12″	...	Br. U. I.	Par.	Tri.	1876	66° 46′ 52·5″

List of points the locality of which is not

PLACES OR POINTS.	Height in feet.	Observer.	Latitude.	Probable error.
Pyramid C.	...	...	41° 19′ 57″	...
,, C′.	...	...	42° 6′ 22·2″	...
,, D.	...	...	39° 38′ 45·6″	...
,, Dk.	...	...	39° 42′ 47″	...
,, Dz.	...	...	41° 4′ 47·9″	...
,, D′.	...	...	40° 5′ 37·3″	...
,, E.	...	...	39° 38′ 28·9″	...
,, E.	...	...	40° 8′ 42·8″	...
,, E.	...	...	41° 19′ 53·5″	...
,, E′.	...	...	42° 13′ 55·6″	...
,, F.	...	...	39° 36′ 44·6″	...
,, Fz.	...	...	39° 39′ 42·6″	...
,, F.	...	...	41° 20′ 5·5″	...
,, G.	...	...	39° 46′ 27″	...
,, G.	...	...	40° 17′ 25·9″	...
,, G.	...	...	41° 20′ 15·6″	...
,, G.	...	...	41° 49′ 5·2″	...
,, Gz.	...	...	40° 56′ 31·2″	...
,, H.	...	...	39° 48′ 23·6″	...
,, I.	...	...	41° 55′ 33·3″	...
,, J.	...	...	39° 46′ 21·1″	...
,, J.	...	...	41° 55′ 48·7″	...
,, K.	...	...	39° 53′ 2·4″	...
,, K.	...	...	41° 21′ 15·5″	...
,, K.	...	...	41° 27′ 15·8″	...
,, L.	...	...	39° 54′ 31·6″	...
,, L.	...	...	41° 30′ 23·1″	...
,, La.	...	...	39° 39′ 32·9″	...
,, M.	...	...	39° 50′ 34·6″	...
,, N.	...	...	39° 53′ 9·8″	...
,, N.	...	...	40° 18′ 15·5″	...
,, N.	...	...	41° 24′ 54·9″	...
,, N_3.	...	...	39° 34′ 26·6″	...
,, N′. (beneath a mountain)	...	...	40° 46′ 57·9″	...
,, O.	...	...	39° 53′ 58·0″	...
,, O.	...	...	41° 34′ 16·5″	...
,, O.	...	...	41° 40′ 49·3″	...
,, Oz.	...	...	40° 53′ 56·2″	...
,, P.	...	...	39° 32′ 40·2″	...
,, P.	...	...	39° 52′ 20·3″	...
,, P.	...	...	41° 35′ 5·0″	...
,, Q.	...	...	41° 34′ 16·5″	...
,, Q.	...	...	39° 52′ 24·1″	...
,, R.	...	...	39° 54′ 31·3″	...
,, R.	...	...	41° 16′ 58″	...
,, R.	...	...	41° 41′ 28·9″	...
,, Ra.	...	...	39° 42′ 54·3″	...
,, S.	...	...	39° 53′ 0·1″	...
,, S.	...	...	41° 47′ 33·7″	...
,, U.	...	...	39° 38′ 15·7″	...
,, X.	...	...	40° 2′ 4·9″	...
,, Xu.	...	...	39° 47′ 10″	...
,, Y.	...	...	39° 37′ 9·1″	...
,, Zk.	...	...	39° 46′ 50·3″	...

fixed by any geographical designation —continued.

Longitude east of Pulkoff.	Probable error.	Instrument.	Observer.	How obtained.	Year.	Longitude east of Greenwich.
38° 53′ 56″	...	Br. U. I.	Sir.	Tri.	1872	69° 13′ 36·5″
39° 7′ 4″	...	Br. U. I.	Rud.	Tri.	1870	69° 26′ 44·5″
36° 28′ 31″	...	Br. U. I.	Par.	Tri.	1876	66° 48′ 11·5″
37° 2′ 13″	...	Br. U. I.	Zal.	Tri.	1874	67° 21′ 53·5″
39° 5′ 58″	...	Br. U. I.	Zam.	Tri.	1871	69° 25′ 38·5″
38° 58′ 34″	...	Br. U. I.	Rod.	Tri.	1873	69° 18′ 14·5″
36° 24′ 19″	...	Br. U. I.	Par.	Tri.	1876	66° 43′ 59·5″
38° 52′ 9″	...	Br. U. I.	Rud. Sk.	...	1873-74	69° 11′ 49·5″
39° 1′ 14″	...	Br. U. I.	Rod. Sir.	Tri.	1870-72	69° 20′ 54·5″
39° 14′ 31″	...	Br. U. I.	Rod.	Tri.	1870	69° 34′ 11·5″
36° 27′ 37″	...	Br. U. I.	Par.	Tri.	1876	66° 47′ 17·5″
37° 1′ 52″	...	Br. U. I.	Zal.	Tri.	1874	67° 21′ 32·5″
39° 6′ 59″	...	Br. U. I.	Rod.	Tri.	1870	69° 26′ 39·5″
36° 18′ 23″	...	Br. U. I.	Par.	Tri.	1876	66° 38′ 3·5″
38° 57′ 15″	...	Br. U. I.	Zam.	Tri.	1871	69° 16′ 55·5″
38° 58′ 11″	...	Br. U. I.	Sir. Rod.	...	1870-72	69° 17′ 51·5″
39° 12′ 4[illegible]″	...	Br. U. I.	Rod.	Tri.	1870	69° 33′ 21·5″
38° 57′ 55″	...	Br. U. I.	Zam.	Tri	1871	69° 17′ 35·5″
36° 18′ 33″	...	Br. U. I.	Par.	Tri,	1876	66° 38′ 13·5″
39° 10′ 51″	...	Br. U. I.	Rod.	Tri.	1870	69° 30′ 31·5″
36° 13′ 28″	...	Br. U. I	Par.	Tri.	1876	66° 33′ 8·5″
39° 2′ 6″	...	Br. U. I.	Rod.	Tri.	1870	69° 21′ 46·5″
36° 0′ 1″	...	Br. U. I.	Par.	Tri.	1876	66° 19′ 41·5″
38° 47′ 57″	...	Br. U. I.	Sir.	Tri.	1872	69° 7′ 37·5″
39° 4′ 19″	...	Br. U. I.	Rod.	Tri.	1870	69° 23′ 59·5″
35° 58′ 37″	...	Br. U. I.	Par.	Tri.	1876	66° 18′ 17·5″
38° 59′ 18″	...	Br. U. I.	Rod.	Tri.	1870	69° 18′ 58·5″
36° 36′ 49″	...	Br. U. I.	Zal.	Tri.	1874	66° 56′ 29·5″
35° 58′ 53″	...	Br. U. I.	Par.	...	1876	66° 18′ 33·5″
35° 57′ 28″	...	Br. U. I.	Par.	Tri.	1876	66° 17′ 8·5″
38° 53′ 31″	...	Br. U. I.	Rud.	Tri.	1873	69° 13′ 11·5″
38° 52′ 12″	...	Br. U. I.	Sir.	Tri.	1872	67° 11′ 52·5″
36° 30′ 45″	...	Br. U. I.	Par.	Tri.	1876	66° 50′ 25·5″
39° 2′ 7″	...	Br. U. I.	Zam.	Tri.	1871	69° 21′ 47·5″
35° 53′ 57″	...	Br. U. I.	Par.	Tri.	1876	66° 13′ 37·5″
39° 2′ 6″	...	...	...	...	1870	69° 21′ 46·5″
39° 0′ 36″	...	Br U. I.	Rod.	Tri.	1870	69° 20′ 16·5″
38° 46′ 49″	...	Br. U. I.	Zam.	Tri.	1871	69° 6′ 29·5″
36° 49′ 25″	...	Br. U. I.	Zal.	Tri.	1874	67° 9′ 5·5″
35° 54′ 13″	...	Br. U. I.	Par.	Tri.	1876	66° 13′ 53·5″
38° 55′ 10″	...	Br. U. I.	Rod.	Tri.	1870	69° 14′ 50·5″
39° 2′ 6″	...	Br. U. I.	Rod.	Tri.	1870	69° 21′ 46″5″
35° 52′ 28″	...	Br. U. I	Par.	Tri.	1876	66° 12′ 8·5″
35° 51′ 54″	...	Br. U. I.	Par.	Tri.	1876	66° 11′ 34·5″
39° 49′ 1″	...	Br. U. I.	Sir.	Tri.	1872	70° 8′ 41·5″
34° 10′ 16″	...	Br. U. I.	Rod.	Tri.	1870	64° 29′ 56·5″
36° 53′ 5″	...	Br. U. I.	Zal.	Tri.	1874	67° 12′ 45·5″
35° 48′ 22″	...	Br. U. I.	Par.	Tri.	1876	66° 8′ 2·5″
39° 6′ 1″	...	Br. U. I.	Rod.	Tri.	1870	69° 25′ 41·5″
36° 45′ 57″	...	Br. U. I.	Zal.	Tri.	1874	67° 5′ 37·5″
37° 22′ 24″	...	Br. U I.	Zam.	Tri.	1874	67° 42′ 4·5″
37° 6′ 1″	...	Br. U I.	Zal.	Tri.	1871	67° 25′ 41·5″
36° 48′ 20″	...	Br. U. I.	Zal.	Tri.	1874	67° 8′ 0·5″
37° 1′ 46″	...	Br. U. I.	Zal.	Tri.	1874	67° 21′ 26·5″

List of points the locality of which is not

PLACES OR POINTS.	Height in feet.	Observer.	Latitude.	Probable error.
Pyramid No. 1	...	...	39° 31′ 43·9″	...
„ „ 2	...	...	39° 33′ 3·1″	...
„ „ 2	...	...	39° 47′ 6·1″	...
The long hillock Pyramid . .	...	...	39° 59′ 1·6″	...
Pyramid on the slopes . . .	...	...	40° 6′ 2·0″	...
Road-side Pyramid . . .	...	...	39° 56′ 6·1″	...
Raised signal	...	...	39° 57′ 38·1″	...
A tree	...	...	39° 59′ 33·1″	...

fixed by any geographical designation.—concluded.

Longitude east of Pulkoff.	Probable error.	Instrument.	Observer.	How obtained.	Year.	Longitude east of Greenwich.
36° 41′ 6″	...	Br. U. I.	Par.	Tri.	1876	67° 0′ 46·5″
36° 36′ 8″	...	Br. U. I.	Par.	Tri.	1876	66° 55′ 48·5″
37° 11′ 6″	...	Br. U. I.	Zal.	Tri.	1874	67° 30′ 46·5″
37° 11′ 52″	...	Br. U. I.	Zal.	Tri.	1874	67° 31′ 32·5″
37° 16′ 0″	...	Br. U. I.	Zal.	Tri.	1874	67° 35′ 40·5″
37° 12′ 16″	...	Br. U. I.	Zal.	Tri.	1874	67° 31′ 56·5″
37° 7′ 45″	...	Br. U. I.	Zal.	Tri.	1874	67° 27′ 25·5″
37° 28′ 8″	...	Br. U. I.	Sk.	Tri.	1874	67° 47′ 48·5″

APPENDIX II.

Alphabetical Index to the Routes included in Kostenko's Turkistán, Vol. II, English Edition, prepared by Major W. E. Gowan, Bengal Infantry, attached to Intelligence Branch, Quartermaster General's Department in India.

From	To	Authority.	Description of Road.	Routes.
A				
Ak-Kuduk	Khokand			No. 58
Ak-Kurgán	Darband			„ 143
Do.	Shirábád			„ 142
Ak-Su	Bárskun Taktásh rivers	Kaulbárs		„ 69
Do.	Kárakol	Sunarguloff		„ 192
Do.	Káshgár	Reintál		„ 70
Do.	Do.	Kuropátkin		„ 195
Do.	Kurlia	Do.	Wheel	„ 196
Do.	Muzárt	Kostenko		„ 189
Do.	Taktásh Bárskun rivers	Kaulbárs		„ 69
Aktám	Iskovát		Wheel	„ 56
Ak-Tásh picket	Chindál picket	Larióuoff		„ 179
Ala-Archa	See Pishpek			
Altin-Emel picket	Kulja		Postal	No. 8
Andiján	Bish-Tásh	Kaulbárs		„ 68
Do.	Buta-Kára		Wheel	„ 34
Do.	Jalálábád		Do.	„ 32
Do.	Khokand Kishlák		Do.	„ 35
Do.	Margilán		Postal	„ 14
Do.	Do.		Wheel	„ 19
Do.	Námángán		Postal	„ 40
Do.	Nárin	Kaulbárs	...	„ 72
Do.	Osh (Ush)		Wheel	„ 30
Do.	Uzganj		Do.	„ 31
Do.	Do.		Do.	„ 33
Andkhui	Kárki	Vámbéry		„ 159
Anzob	Dushambe	Aminoff		„ 99
Aulie-Ata	Námángán	District staff		„ 71
Ayuk Well	Shaik-Arik (ferry)			„ 108
B				
Bábadarkhán	Chust		Wheel	No. 37
Baisun	Kobádian		Hill	„ 148
Do.	Shirábád		Hill	„ 149
Bakhti	Ujár		Wheel	„ 64
Bálkh	Herát	Ferrier		„ 161
Do.	Kwája-Sálih	Burnes		„ 160
Bár-Panjah	Faizábád (Bádakhshán)			„ 167
Do.	Kára-Kul (Lake)			„ 166
Bárskun Taktásh rivers	Aksu	Kaulbárs		„ 69
Barskun (river)	Kárakol	Do.		„ 76
Do.	Uch-Turfán	Do.		„ 191
Bus-Kára Well	Bish-Bulák well	District staff		„ 107
Bish-Arik	Marv	Khokbriákoff		„ 158

Alphabetical Index to the Routes, &c.—continued.

From	To	Authority.	Description of Road.	Routes.
Bish-Bulák Well	Bas-Kára Well	District staff		No. 107
Bish-Tásh	Andijan	Kaulbárs		„ 68
Bugur-Dishik	Marv	Khokhriákoff		„ 155a
Bukhára	Chahárjui	District staff		„ 128
Do.	Kárshi	Máyeff		„ 127
Do.	Kátta-Kurgán	Kostenko		„ 121
Do.	Kazála	District staff		„ 118
Do.	Do.	Do.		„ 119
Do.	Do.	Do.		„ 120
Do.	Sámarkand	Do.		„ 122
Butá-Kára	Andiján		Wheel	„ 34
C				
Chahárjui	Bukhára	District staff		No. 128
Do.	Marv			„ 155
Do.	Uch-Uchák	Khokhriákoff		„ 130
Chináz	Fort No. 1		River route	Page 323
Chindál picket	Ak-Tásh picket	Lariónoff		No. 179
Do.	Kur-Kára-Usu	Do.		„ 180
Do.	Manjar-Kulja	Do.		„ 178
Do.	Yádza picket	Do.		„ 181
Chu (river)	Turkistán			„ 60
Chuguchák	Shikho	Másloff		„ 190
Chukát	Zizdi			„ 98
Chust	Bábadarkhán		Wheel	„ 37
Do.	Kámish-Kurgán		Do.	„ 38
Do.	Khokand		Do.	„ 22
Do.	Margilán (New)		Do.	„ 20
Do.	Námangán			„ 36
D				
Darband	Ak-Kurgán			No. 143
Do.	Denau			„ 144
Do.	Sháar			„ 133
Dasht-i-Kázi	Urmitan	Aminoff		„ 85
Do.	Zarafshán Glacier	Do.		„ 84
Deh-i-Balan	Káfarnihan	Do.		„ 97
Deh-i-Nau	Hissár			„ 145
Denau	Darband			„ 144
Dushambe	Anzób	Aminoff		„ 99
F				
Faizábád (Bádakhshán)	Bár-Panjah			„ 167
Do.	Kuliáb	Korólkoff		„ 171
Do.	Peshâwur	Havildar		„ 173
Do. (Hissár)	Hissár			„ 146
Do. do.	Káramuk (Little)	Oshánin		„ 169
Do. do.	Kuliáb			„ 147
Fort No. 1	Chináz		River route	Page 323
Do. 2	Perovski (fort)			No. 65
G				
Garm	Kalah-i-Khum	Oshánin		No. 170
Do.	Pákshiff	Aminoff		„ 96
Gulcha	Irkishtám		Pack	„ 48

Alphabetical Index to the Routes, &c.—continued.

From	To	Authority.	Description of Road.	Routes.
Gulcha	Uzganj		Pack	No. 46
Do.	Do.		Do.	„ 47
H				
Hámi	Kulja	Imperial Chinese		No. 175
Herát	Bálkh	Ferrier		„ 161
Do.	Patta-Kisár			„ 162
Hissár	Deh-i-Nan			„ 145
Do.	Faizábád (Hissár)			„ 146
Do.	Kobádian			„ 151
Huzár	Jám			„ 135
Do.	Kalif			„ 139
Do.	Kárshi	Máyeff		„ 129
Do.	Kuitán			„ 140
Do.	Mazár-i-Sharif	Mátváyeff		„ 152
Do.	Sháar			„ 134
Do.	Shirábád			„ 136
I				
Iliyáli	Khiva	Kostenko		No. 112
Irkishtám	Gulcha		Pack	„ 48
Do.	Káshgár	Kuropátkin		„ 194
Do.	Sufi-Kurgán	Do.		„ 193
Isfára	Khokand		Wheel	„ 25
Do.	Rishtán		Do.	„ 53
Do.	Warukh		Do.	„ 55
Iskandar Kul	Kára-Tágh	Aminoff		„ 100
Do.	Várziminár	Do.		„ 91
Iskovát	Aktám		Wheel	„ 56
Do.	Námángán		Do.	„ 42
Izis	Khidziff-Aftábru	Aminoff	...	„ 89
J				
Jalálábád	Andiján		Wheel	No. 32
Do.	Uzganj		Do.	„ 50
Jám	Huzár			„ 135
Jin-kho	Kulja	Lariónoff		„ 176
Do.	Do.	Do.		„ 177
Jizák	Khiva	District staff		„ 106
Do.	Ura-Tapa		Wheel	„ 6
K				
Kabakli (fort)	Marv			No. 153
Kábul	Mazár-i-Sharif	Benderski		„ 163
Káfirnihán	Deh-i-Balan	Aminoff		„ 97
Kalah-i-Khum	Garm	Oshánin		„ 170
Do.	Kára-Kul (lake)			„ 168
Kala Panjah	Tuyuk pass	Severtseff		„ 165
Kalif	Huzár			„ 139
Do.	Kára-Kamar			„ 138
Do.	Shirábád			„ 137
Kámish-Kurgán	Chust		Wheel	„ 38
Do.	Khojand		Do.	„ 39
Karáchi-Kum	Khokand		Do.	„ 26
Kára-Kamar	Kalif			„ 138

Alphabetical Index to the Routes, &c.—continued.

From	To	Authority.	Description of Road.	Routes.
Kára-Kishlák	Marv			No. 154
Kárakol	Aksu	Sunargúloff		„ 192
Do.	Bárskun (river)	Kaulbárs		„ 76
Do.	Muzárt		Postal (baggage animals).	„ 10.
Do.	Nárin	Pichugin		„ 73
Do.	Pishpek		Postal	„ 7
Do.	Vairnoye	Kaulbárs		„ 75
Kára-Kul (lake)	Bár Panjah			„ 166
Do.	Kalah-i-Khum			„ 168
Káramuk (little)	Faizábád (Hissár)	Oshánin		„ 169
Kárashar	Kitai picket	Larióнoff		„ 183
Do.	Do.	Do.		„ 185
Do. (fort)	Kurlia	Wilkins		„ 197
Kára-Tágh	Iskandar-Kul	Aminoff		„ 100
Kárategin	Zarafshán	Do.		„ 94
Kárki	Andkhui	Vámbéry		„ 159
Kárshi	Bukhára	Máyeff		„ 172
Do.	Huzár	Do.		„ 129
Do.	Sámarkand	District staff		„ 124
Do.	Shaar	Máyeff		„ 126
Kasán	Námángán		Wheel	„ 41
Káshgár	Aksu	Reintál		„ 70
Do.	Do.	Kuropátkin		„ 195
Do.	Irkishtám	Do.		„ 194
Do.	Nárin	Kaulbárs		„ 78
Do.	Do.	Reintál		„ 131
Do.	Tokmák	Kaulbárs		„ 77
Katta-Kurgàn	Bukhára	Kostenko		„ 121
Do.	Peter Alexander (fort)	District staff		„ 110
Do.	Táshkand		Postal	„ 4
Kazála	Bukhára	District staff		„ 118
Do.	Do.	Do.		„ 110
Do.	Do.	Do.		„ 120
Do.	Nukus (fort)	Do.		„ 101
Do.	Peter-Alexander (fort)	Hermánn		„ 80
Do.	Do. do.	District staff		„ 102
Kháwja-Salil	Bálkh	Burnes		„ 160
Khidziff-Aftábrn	Izis	Aminoff		„ 89
Khiva	Iliyáli	Kostenko		„ 112
Do.	Jizák	District staff		„ 106
Do.	Kinderli			„ 116
Do.	Do. bay			„ 117
Do.	Kuhna-Urganj			„ 113
Do.	Peter-Alexander (fort)			„ 105
Do.	Shaikh-Arik			„ 111
Khoja-Chauk	Wádil	Aminoff		„ 95
Khoja-Kunduz	Maru			„ 157
Khojand	Kámish-Kurgán		Wheel	„ 39
Do.	Khokand		Postal	„ 21
Do.	Námángán			„ 62
Khulm (Tásh-Kurgán)	Tásh-Kurgán	Mirza		„ 172
Kinderli	Khiva			„ 116
Do. bay	Do.			„ 117

Alphabetical Index to the Routes, &c.—continued.

From	To	Authority.	Description of Road.	Routes.
Kishtut .	Sarváda .	Aminoff .		No. 93
Kitai picket .	Kárashár .	Larіónoff .		„ 183
Do. .	Do. .	Do. .		„ 185
Kobádian .	Baisun .		Hill .	„ 148
Do. .	Hissár .			„ 151
Do. .	Narak .			„ 150
Khokand .	Ak-Kuduk .			„ 58
Do. .	Chust .		Wheel .	„ 22
Do. .	Isfára .		Do. .	„ 25
Do. .	Khojand .		Postal .	„ 21
Do. .	Kárachikum .		Wheel .	„ 26
Do. .	Margilán .		Postal .	„ 13
Do. .	Námángán .		Wheel .	„ 29
Do. .	Rishtán .		Do. .	„ 28
Do. .	Sokh .		Do. .	„ 21
Do. .	Teliau .		Caravan	„ 23
Do. .	Do. .		Do.	„ 24
Khokan-Kishlák .	Andiján .		Wheel .	„ 35
Kitai picket .	Kulja .	Larіónoff .		„ 182
Kok-kala (Mehtar-kala)	Nukus (fort) .	District staff .		„ 79
Kopál .	Lepsa .		Postal .	„ 9
Krásnovodsk .	Sári-Kámish (lake) .			„ 115
Do. .	Shirábád .			„ 141
Kuhna-Urganj .	Khiva .		Mountain	„ 113
Kuitán .	Huzár .			„ 140
Do. .	Sári-Kámish (lake) .			„ 114
Kuliáb .	Faizábád .			„ 147
Do. .	Do. (Bádakhshán)	Korólkoff .		„ 171
Kulja .	Altin-Emel .		Postal .	„ 8
Do. .	Jin-kho .	Larіónoff .		„ 176
Do. .	Do. .	Do. .		„ 177
Do. .	Hámi .	Imperial Chinese		„ 175
Do. .	Kitai picket .	Larіónoff .		„ 182
Do. .	Lepsa .	Do. .		„ 174
Do. .	Muzárt .	Kostenko .		„ 188
Do. .	Shikho .			„ 186
Do. .	Urumchi .	Larіónoff .		„ 184
Kur-Kara-Usu .	Chindál picket .	Larіónoff .		„ 180
Kurlia .	Aksu .	Kuropátkin .	Wheel .	„ 196
Do. .	Kárashár (fort) .	Wilkins .		„ 197
L				
Lepsa .	Kopál .	.	Postal .	No. 9
Do. .	Kulja .	Larіónoff .		„ 174
Do. .	Manás .	Kamenski .		„ 187
Do. .	Urjár .	District staff .		„ 83
M				
Manás .	Lepsa .	Kamenski .		No. 187
Manjur-Kulja .	Chindál picket .	Larіónoff .		„ 178
Margilán .	Andiján .	.	Postal .	„ 14
Do. .	Do .	.	Wheel .	„ 19
Do. .	Khokand .	.	Postal .	„ 13
Do. .	Námángán .	.	Do .	„ 18
Do. (new) .	Chust .	.	Wheel .	„ 20

Alphabetical Index to the Routes, &c. —continued.

From	To	Authority.	Description of Road.	Routes.
Margilán	Osh (Ush)		Postal	No. 15
Do.	Rishtán		Wheel	„ 49
Do.	Uch-Kurgán		Wheel	„ 16
Do.	Wádil		Do.	„ 17
Marv	Bágur-Dishik	Khokhriákoff		„ 155A
Do.	Bish-Arik	Do.		„ 155
Do.	Chabárjui			„ 158
Do.	Kabakli (fort)			„ 153
Do.	Kára-Kishlák			„ 154
Do.	Khoja-Kunduz			„ 137
Do.	Rishtán			„ 156
Mazár-i-Sharif	Huzár	Mátváyeff		„ 152
Do.	Kábul	Benderski		„ 163
Min-Bulák	Peter-Alexander (fort)	District staff		„ 104
Min-Tapa	Uch-Kurgán		Wheel	„ 57
Muzárt	Aksu	Kostenko		„ 189
Do.	Kárakol		Postal (baggage animals).	„ 10
Do.	Kulja	Kostenko		„ 188
N				
Námángán	Andiján		Postal	No. 40
Do.	Aulie-Ata	District staff		„ 71
Do.	Chust			„ 36
Do.	Iskovát		Wheel	„ 42
Do.	Kasán		Do.	„ 41
Do.	Khojand			„ 62
Do.	Khokand		Wheel	„ 29
Do.	Margilán		Postal	„ 18
Do.	Táshkand			„ 61
Do.	Uch-Kurgán		Wheel	„ 43
Nárak	Kobádian			„ 150
Nárin	Andiján	Kaulbárs		„ 72
Do.	Kárakol	Pichugin		„ 73
Do.	Káshgár	Reintál		„ 131
Do.	Do.	Kaulbárs		„ 178
Do.	Tokmák		Postal	„ 11A
Do.	Do.	Kaulbárs		„ 74
Nukus (fort)	Kazála	District staff		„ 101
Do.	Kok-kala (Mehter-Kala)	Do.		„ 79
Do.	Peter-Alexander (fort)	Do.		„ 103
O				
Oburdan	Pastigau	Aminoff		No. 88
Orenburg	Táshkand		Postal	„ 1
Orsk	Turkistán			„ 67
Osh (Ush)	Andiján		Wheel	„ 30
Do.	Margilán		Postal	„ 15
Do.	Tuyuk pass	Kostenko		„ 164
Do.	Uzganj		Wheel	„ 44
Do.	Do.		Pack	„ 45
Do.	Wádil		Wheel	„ 51
P				
Pakhut	Visháb	Aminoff		No. 87
Pákshiff	Garm	Do.		„ 96

Alphabetical Index to the Routes, &c.—continued.

From	To	Authority.	Description of Roads.	Routes.
Paldorak	Tabushin	Aminoff		No. 90
Pastigau	Oburdan	Do.		„ 88
Pátta-Kisár	Herát			„ 162
Perovski (fort)	Fort No. 2			„ 65
Do.	Peter-Alexander (fort)	District staff		„ 104
Pervo-Nachálni	Do.		Wheel	„ 82
Pesháwur	Faizábád (Bádakhshán)	Havildar		„ 173
Peter-Alexander (fort)	Kátta-Kurgán	District staff		„ 110
Do.	Kazála	Hermánn		„ 80
Do.	Do.	District staff		„ 102
Do.	Khiva			„ 105
Do.	Min-Bulák	District staff		„ 109
Do.	Nukus (fort)	Do.		„ 103
Do.	Perovski (fort)	Do.		„ 104
Do.	Pervo-Nachálni		Wheel	„ 82
Do.	Steam-boat quay		Do.	„ 81
Pishpek (Ala-Archa)	Kárakol		Postal	„ 7
Do.	Vairnoye			„ 63
R				
Rishtán	Isfára		Wheel	No. 53
Do.	Khokand		Do.	„ 28
Do.	Margilán		Do.	„ 49
Do.	Marv			„ 156
Do.	Wádil		Do.	„ 54
S				
Sámarkand	Bukhára	District staff		No. 122
Do.	Kárshi	Do.		„ 124
Do.	Shahr-i-Sabz	Do.		„ 123
Do.	Sháar	Máyeff		„ 125
Sar-i-Jui	Do.			„ 132
Sári-Kámish (lake)	Krásnovodsk			„ 115
Do. (do.)	Kuhna-Urganj			„ 114
Sarváda	Kishtut	Aminoff		„ 93
Do.	Yagnáb river	Do.		„ 92
Semipalata	Táshkand			„ 2
Sergiopol	Urjár		Postal	„ 12
Sháh-i-Mardán	Wádil		Wheel	„ 52
Shahr-i-Sabz	Sámarkand	District staff		„ 123
Shaik-Arik (ferry)	Ayuk well			„ 108
Do. (do.)	Khiva			„ 111
Sháar	Darband			„ 133
Do.	Huzár			„ 134
Do.	Kárshi	Máyeff		„ 126
Do.	Sámarkand	Do.		„ 125
Do.	Sar-i-Jui			„ 132
Shikho	Chuguchák	Másloff		„ 190
Do.	Kulja			„ 186
Shirábád	Ak-Kurgán			„ 142
Do.	Baisun		Hill	„ 149
Do.	Huzár			„ 136
Do.	Kalif			„ 137
Do.	Kuitán		Mountain	„ 141
Sokh	Khokand		Wheel	„ 27

Alphabetical Index to the Routes, &c.—continued.

From	To	Authority.	Description of Roads.	Routes.
Steam-boat quay	Peter-Alexander (fort)		Wheel	No. 81
Sufi-Kurgán	Irkishtám	Kuropátkin		„ 193
T				
Tabushin	Paldorak	Aminoff		No. 90
Táshkand	Kátta-Kurgán		Postal	„ 4
Do.	Námángán			„ 61
Do.	Orenburg		Postal	„ 1
Do.	Semipaláta			„ 2
Do.	Teliau			„ 5
Do.	Ura-Tapa		Postal	„ 3
Tásh-Kurgán	Khulm (Tásh-Kurgán)	Mirza		„ 172
Telau	Toi-Tapa		Wheel	„ 59
Teliau	Khokand		Caravan	„ 23
Do.	Do.		Do.	„ 24
Do.	Táshkand			„ 5
Toi-Tapa	Telau		Wheel	„ 59
Tokmák	Káshgár	Kaulbárs		„ 77
Do.	Nárin		Postal	„ 11 A
Do.	Do.	Kaulbárs		„ 74
Troitsk	Turkistán	District staff	Caravan	„ 66
Turkistán	Chu (river)			„ 60
Do.	Orsk			„ 67
Do.	Troitsk	District staff	Caravan	„ 66
Tuyuk pass	Kala-Panjah	Servetseff		„ 165
Do.	Osh (Ush)	Kostenko		„ 164
U				
Uch-Kurgán	Margilán		Wheel	No. 16
Do.	Min-Tapa		Do.	„ 57
Do.	Námángán		Do.	„ 43
Uch-Turfán	Bárskun (river)	Kaulbárs		„ 191
Uch-Uchak	Chahárjui	Khokhriákoff		„ 130
Ura-Tapa	Jizák		Wheel	„ 6
Do.	Táshkand		Postal	„ 3
Ujár	Bakhti		Wheel	„ 64
Do.	Lepsa	District staff		„ 83
Do.	Sergiopol		Postal	„ 12
Urmitán	Dásht-i-Kázi	Aminoff		„ 85
Do.	Várziminár	Do.		„ 86
Urumchi	Kulja	Larionoff		„ 184
Uzganj	Andiján		Wheel	„ 31
Do.	Do.		Do.	„ 33
Do.	Gulcha		Pack	„ 46
Do.	Do.		Do.	„ 47
Do.	Jalálábád		Wheel	„ 50
Do.	Osh (Ush)		Do.	„ 44
Do.	Do.		Pack	„ 45
V				
Vairnoye	Karakol	Kaulbárs		No. 75
Do.	Pishpek			„ 63
Várziminár	Iskandar-Kul	Aminoff		„ 91
Do.	Urmitán	Do.		„ 86

Alphabetical Index to the Routes, &c.—concluded.

From	To	Authority.	Description of Roads.	Routes.
Visháb	Pakhut	Aminoff		No. 87
W				
Wádil	Khoja-Chauk	Aminoff		No. 95
Do.	Margilán		Wheel	„ 17
Do.	Osh (Ush)		Do.	„ 51
Do.	Rishtán		Do.	„ 54
Do.	Sháh-i-Mardán		Do.	„ 52
Warukh	Isfára		Do.	„ 55
Y				
Yádza picket	Chindál picket	Lariónoff		No. 181
Yagnáb river	Sarváda	Aminoff		„ 92
Yáktásh } rivers Bárskun }	Ak-Su	Kaulbárs		„ 69
Z				
Zarafshán Glacier	Dásht-i-Kázi	Aminoff		No. 84
Do.	Káraтegin	Do.		„ 94
Zizdi	Chukát			„ 98

APPENDIX III.

Chronological Table relating to important events and personages in the History of Central Asia and of India, compiled by Major W. E. Gowan, Bengal Infantry, attached to Intelligence Branch, Quartermaster General's Department in India, from the following works :—

I.—"Invasions of India from Central Asia," by M. J. Colquhoun; pp. XVI and 344, 8vo.; Richard Bentley and Son, London, 1879 (also from some M.S. interpolations in this volume by Major M. J. King-Harman)."

II.—"Merv, the Queen of the World and the Scourge of the Man-Stealing Turcomans," pp. XX and 451, 8vo. W. H. Allen and Co., London, 1881.

III.—*Turkistán Calendar* for 1880, comprising various information relating to Turkistán, in respect of its History, Administration, Trade, &c., &c., &c. Táshkand, 1879, 404 pp., 8vo.

IV.—"The Expedition for the survey of the rivers Euphrates and Tigris, carried on by order of the British Government in the year 1835, 1836, and 1837, preceded by geographical and historical notices of the regions situated between the rivers Nile and Indus, in 4 volumes"* by Lieutenant-Colonel Chesney, R.A., Longman, Brown, Green, and Longman, London, 1850.

354 B.C.	Birth of Alexander the Great.
328 B.C.	Merv founded by Alexander the Great.
327 B.C.	Alexander marches towards the Indus.
324 B.C.	Alexander the Great conquers India.
420 A.D.	The Christian Archbishopric of Merv made a Metropolitan See.
450 A.D.	Huns under Attilla, the earliest record of Turkistán that history gives.
545 A.D.	Khán of Geougen killed by the Turks.
704 A.D.	Kuteibe, the Arab Chief, marches from Merv against Bálkh and takes it.
705 A.D.	Kuteibe crosses the Oxus with 21,000 men and plunders Sámarkand.
711 A.D.	Kuteibe, having conquered Bukhára, subjugates Farghána and Káshgária.
714 A.D.	Kuteibe, having revolted at Merv against the Khalif, is abandoned by his troops and slain.
715 A.D.	Yazid-Bin-Muhálib succeeds Kuteibe as Governor of Khurássán.
724 A.D.	The Turks in Trans-Oxiana rise against the Arabs and occupy Sámarkand, but Jándáb marches against them from Merv with 43,000 men and defeats them. Jándáb dies at Merv soon after his return from the above campaign.
743 A.D.	Nasr-Bin-Sayar is appointed Governor of Khurássán.
746 A.D.	Nasr-Bin-Sayar, Governor of Khurássán," is overthrown.
767 A.D.	Mokána, the "Veiled Prophet of Khurássán," begins to promulgate his doctrines at Merv. Being driven thence, he flies to Turkistán.
777 A.D.	Muáz-Bin-Muslim is appointed Governor of Khurassán by the Khalif in order to put down the new sect established by Mokána, the "Veiled Prophet of Khurássán." With a large army Muáz marches from Merv to Turkistán. He is at first defeated by Mokána's followers, but afterwards coops up and besieges the "Veiled Prophet" at Kitáb (Kesh).
779 A.D.	Muáz-Bin-Muslim is superseded by Said-ul-Járshi as Governor of Khurássán because the Khalif considers he is prosecuting the siege of Kitáb (Kesh) in too dilatory a manner.
781 A.D.	Mokána, despairing of escape from Kitáb (Kesh), where he is besieged, commits suicide by throwing himself into a furnace.
874 A.D.	Arab rule in Central Asia comes to a close.

---

* Only two volumes available for reference.—W. E. G.

903 A.D.	Bukhára becomes the dominant State of Central Asia and Mistress of Merv.
977 A.D.	Sabaktagin (father of Máhmud) enters India *viá* Pesháwar.
1001 A.D.	Máhmud of Ghazni with 10,000 horse, approaches India *viá* the Kábul river and Pesháwar. He attacks and defeats Jai Pál and returns by a more southerly route.
1004 A.D.	Máhmud of Ghazni enters India *viá* Multán.
	The dynasty of the Samanídes comes to an end. Rise of the Seldjukídes.
1005 A.D.	Máhmud of Ghazni attacks Multán crossing the Indus near Isa Kheyl, having probably come from Ghazni *viá* Bunnoo.
1006 A.D.	Máhmud of Ghazni attacks Multán, which he approaches from Pesháwar.
1010 A.D.	Máhmud of Ghazni invades India, entering by Pesháwar.
1017-18 A.D.	Máhmud of Ghazni invades India and advances as far as Kunauj, coming by Pesháwar.
1021 A.D.	Máhmud of Ghazni invades India *viá* Pesháwar, advancing to Kunauj and sacking part of Káshmir on his return.
1023 A.D.	Máhmud of Ghazni invades India and takes Gwalior.
1024 A.D.	Máhmud of Ghazni marches from Ghazni in September, reaches Multán in October, having probably come by the Gomal or Sunghur route. His baggage was carried by 20,000 camels. He takes and sacks Somnáth, and returns to Ghazni through Scinde.
1030 A.D.	The Seldjukídes, being forced to quit Turkistán, appear in the neighbourhood of Merv.
1031 A.D.	Mussood captures the Fort of Sursooti in Káshmir, and advances thence to Hánsi and Lahore.
1035 A.D.	The Seldjukídes conquer Merv and Khurássán.
1128 A.D.	The power of the Seldjukídes ceases.
1155 A.D.	Birth of Temuchin (Chingiz Khán) conqueror of the Mongol-Turkish Horde.
1162 A.D.	Shahabeddin, Seljook Sultán, carries on several campaigns in India and subdues that country almost up to the frontiers of China. At the same time his brother captures the towns of Nishapur, Herát and Meru, and penetrates to Turkistán.
1179-84 A.D.	Máhmud of Ghazni invades India *viá* Pesháwar.
1191 A.D.	Muhammad Ghurian invades India and takes Bitunda. One of his columns traverses the defiles of the Suleimán range either by the Gomal or Sunghur pass. His Lieutenant, Ilduz, meanwhile keeps the road open from the Indus to Ghazni by the Kuram Pass. Previous to this, Ilduz has captured Ghazni for his master, advancing from the Kuram and crossing the Shutur-Gardan Pass.
1193 A.D.	Máhmud of Ghazni invades India, entering *viá* Peshàwar at the head of 120,000 horse.
	Birth of the famous Persian poet, Saadi Shirázi, author of those remarkable productions of Persian literature, the "Gulistán" and "Bostán."
1194 A.D.	Máhmud of Ghazni invades India and takes Kunauj.
1195 A.D.	Máhmud of Ghazni invades India and takes Guzerát.
1206 A.D.	Temuchin, at the chosen spot Kurultai, near the sources of the Amur, in the centre of Mongolia, assumes the new title of Chingiz Khán. Subsequent to that he penetrates to the depths of Siberia and subdues various Mongol and Turkish races in Northern Corea, the steppes of Gobi, to the west of the Chinese Wall, and on the frontier of Tibet. Chingiz Khán, with his youngest son Tuli, goes to Bukhára and Sámarkand, sending his eldest son, Chuchi, to Táshkand, his second and third sons, Chagatai and Oktai or Ogotai, to Otrár on the Jaihún (Oxus or Amu-Daria).
1219 A.D.	The spiritual head of the *Sunis* places himself at the head of the inhabitants of the most important provinces of Khovarézim,

	Sámarkand, and Herát, and invites the aid of the Pagan Mongols and of Chingiz Khán against Muhammad, the Sultán of Khovarézim.
1220 A.D.	The Mongols sack Merv; 100,000 people slain.
1221 A.D.	Genghiz Khán invades India *viá* the Kuram Valley.
	The Mongols, in besieging Kuhna-Urganj (in Khiva), destroy the dam across the Oxus, which thereupon flow from the Aral into the Caspian.
	Chingiz Khán comes up with and defeats Jelaludin at the river Indus.
1224 A.D.	Moghuls under Genghiz Khán overthrow Turkish supremacy in Turkistán.
	Chingiz Khán inaugurates on a large scale at Sámarkand a hunt of wild beasts.
	The Russians are utterly defeated at the river Kálka, and the whole of the south of Russia lies open to the enemy.
1227 A.D.	Death of Chingiz Khán. According to his will the countries conquered by him are to descend to Okta, who is to have sovereign power over his brethren and to enjoy the title of "Great Khán." To his nephew Batai, surnamed "the Kipchák," are to descend the Orenburgh and Astrakhán steppes. Chagatai receives the stretch of country beyond the Jaihun (Amu) and Tuli, Eastern and Western Persia, with the conquered portion of India.
1231 A.D.	Hordes of Osmán's Turks enter Asia Minor and found there the predatory kingdom of the Kára-Hissár, thus establishing a formidable sovereignty in the East.
1237 A.D.	Batai overthrows, at the river Voronej, the army of the Grand Duke of Riázán, defeats Uri II, Grand Duke of Vladímir, and captures and destroys Vladímir, Moscow, and other towns.
1238 A.D.	Genghiz Khán invades Europe.
1240 A.D.	The Tatars gain possession of Kieff, at that time the Capital of Russia.
1241 A.D.	Death of Okta, (from the effects of drink), the conqueror of the entire Mongol horde.
1256 A.D.	Batai's death.
1299 A.D.	400 families of Turks march from the Oxus westward.
1303 A.D.	Moghul invasion of India.
1336 A.D.	Támerlane (Timur), King of Sámarkand, Bádákhshán, Turkistán, Afghánistán, Hindustán (as far as Delhi), all Asia Minor, Syria and Egypt.
1353 A.D.	Turks, from the Oxus, gain Asia Minor by conquest and enter Europe.
1367 A.D.	Sultán Muhammad Mirza (House of Timur), King of Sámarkand. The exact date of his birth and death not known.
	Mirza Mirán Sháh, 3rd son of Támerlane (Timur), King of Sámarkand.
1369 A.D.	Timur (Támerlane) selects Sámarkand as his Capital, whence he overruns North-Eastern Persia. He likewise often goes to Bukhára to attend festivals, celebrate marriages, &c.
1383 A.D.	Turks, under Támerlane (Timur), recover their supremacy in Central Asia.
1398 A.D.	Timur with one column crosses the Hindu-Kush and reaches Kábul by "the usual route," which is probably the Shibr Pass, at the western end of the Ghorbund Valley. This valley descends upon the Surkháb river which flows from Bámian. The pass is never closed in winter. Timur left Kábul in August, marched by Hariáb and Bunnoo to Dinkote and crossed the Indus by a bridge made of rafts and reeds. Meanwhile the other column under his General, Pir Muhammad, who had been fighting in the Suleimán range, crosses the Indus in a line with Utch (north of Jacobábád) and attacks and takes Multán. Timur returns by Meerut and Jummoo, whence he turns into the old route by the Kuram Valley to Kábul and on by the Shibr or Shabar Pass.

1405 A.D.	Death of Támerlane (Timur).
1408 A.D.	Mirza Mirán Sháh, 3rd son of Támerlane (Timur), killed.
1427 A.D.	Sultán Abu Said Mirza (House of Timur) King of Sámarkand.
1456 A.D.	Omar Sheikh Mirza (House of Timur), King of Farghána, the Russian province of Khokand.
1469 A.D.	Sultán Abu Said Mirza (House of Timur), King of Sámarkand, killed.
1476 A.D.	Beginning of the literary activity of the Central Asian popular poet Mavlai Jám.
1483 A.D.	Sultán Bábar (House of Timur) mounts the throne of Farghána (the Russian province of Khokand) at the age of 11 years: conquers Kábul, Kandahar, Bádákhshán, Ghazni, and India. The Uzbaks occupy Turkistán, Sámarkand, and Farghána.
1504 A.D.	Bábar crosses the Hindu-Kush range into Kábul by the Kipchak Pass.
1505 A.D.	Bábar advances through the Khyber to Pesháwar, whence he proceeds to Kohát, Thull, Hungoo, Bunnoo, Deht or Damán to the Gomal river. Thence south to the Indus (near Mooltán) at Belah. Thence to Sukhi Surwah, Chotiáli, Kuhna, Nain and Sirdeh to Ghazni and Kábul, which place he reaches in May 1505.
	The Uzbaks occupy Merv.
1506 A.D.	Támerlane's (Timur's) possessions in Turkistán lost to the Uzbaks, a Moghul tribe.
1507 A.D.	Bábar conquers Kábul, that beautiful but poor country, "the Switzerland of Asia."
1509 A.D.	Rána Sanka of Mewar (Bábar's adversary), now represented by the house of Udipur, was the head of the great Rájput republic of small states which never acknowledged fealty to Mussulmán rule.
1510 A.D.	The Persians destroy the Uzbak army and kill Saibáni Muhammad under the walls of Merv and occupy the city.
1519 A.D.	Bábar advances through Bajowr and Swat and crosses the Indus at Niláb: He crosses the Sohán river in February and returns by Ali Masjid.
1525 A.D.	Bábar advances through the Khyber (proceeding himself on a raft down the Kábul river). He was returning by the Dhoon, Rupar, and Sursáwul, when he turned off at the latter place to Delhi and Agra.
1526 A.D.	Bábar (House of Timur) ascends the throne of India.
	Bábar (House of Timur) acquires the famous Koh-i-Nur diamond.
1530 A.D.	Bábar (House of Timur) dies at Agra; buried in Kábul.
	Humáyun (House of Timur) ascends the throne of India; is expelled by Shir Sháh.
1540 A.D.	Shir Sháh (House of Sur) ascends the throne.
1543 A.D.	Humáyun retires from India, crossing the Indus above Mooltán and proceeding to Quetta *viá* Uch.
1545 A.D.	Shir Sháh (House of Sur) is killed in action. Civil War.
1552 A.D.	After the fall of Kazán and of Astrakhán, through which passed Russia's trade with the East, ambassadors were sent to John the Terrible from Sámarkand, Bukhára, and other parts of Central Asia, with request that he would open trade relations with them.
1555 A.D.	Humáyun reconquers India, advancing at the head of 15,000 horse *viá* Pesháwar.
1556 A.D.	Humáyun (House of Timur) is killed by a fall inside Purána Killa. It is elsewhere stated that he died at Delhi, in the year 1555 A.D.
	Akbar (House of Timur) ascends the throne.
1558 A.D.	Master Anthony Jenkinson lands at Mangishlák on the Caspian, on his way from Russia to Bukhára across the Turkumán deserts, and arrives at Bukhára.
1559 A.D.	Master Anthony Jenkinson returns to Mangishlák from Bukhára.

1570 A.D. The Oxus again flows into the Aral instead of into the Caspian.

1587 A.D. Abdullah, Khán of Bukhára, sends an envoy with a letter to the Tsar Theodor Ivánovitch.

1603 A.D. The town of Kuhna-Urganj is pillaged by the Ural Cossacks under the leadership of Nechai.

1605 A.D. Akbar (House of Timur) dies.

Jehángir (House of Timur) ascends the throne.

1620 A.D. Michael Theódorovitch sends the courtier Khokhloff to Bukhára.

1627 A.D. Jehángir (House of Timur) dies whilst on a journey between Káshmir and Lahore.

1628 A.D. Sháh Jahán (House of Timur) ascends the throne.

Provinces comprising the Empire of Sháh Jahán (House of Timur):—

	Revenue. £
Agra	2,812,500
Ajmere	1,875,000
Allahábád	1,250,000
Bádakhshán*	125,000
Bálkh*	218,750
Bengal	1,562,500
Berar	1,718,750
Buglána*	625,000
Daulatábád	1,718,750
Delhi	3,125,000
Guzerát	1,651,250
Kábul	468,750
Káshmir*	468,750
Khandeish	1,250,000
Lahore	2,812,500
Málwa	1,250,000
Multán	875,000
Orissa	625,000
Oude	937,500
Tillingana*	937,500
TOTAL	26,307,500

The provinces marked * were added to the Empire by Sháh Jahán.

1647 A.D. Sháh Jahán's (House of Timur) forces, as paid out of the revenue of his Empire, amounted to 911,400 horse and foot.

1648 A.D. Modern Delhi was built by Sháh Jahán (House of Timur).

1653 A.D. Dára, son of Sháh Jahán, at the head of 104,000 men, invades Kandahar from India, crossing the Sunghur pass and sending his siege guns by the Bolán.

1658 A.D. Sháh Jahán (House of Timur) deposed.

Aurungzebe or Alumgir I (House of Timur) ascends the throne.

1661 A.D. Bombay acquired by the British from the Portuguese as the marriage portion of Catherine of Braganza.

1698 A.D. Birth of Nádir Sháh, also called Nádir Kuli. He was descended from the Karákli branch of the Afshár or Aushár tribe of Turkumáns.

1700 A.D. Sháh Máz-Khán, the ruler of Khiva, expresses a wish to become the feudatory of Russia.

1707 A.D. Aurungzebe or Alumgir I (House of Timur) dies at Ahmednagar in the Deccan, aged 89.

Provinces of the Empire of Aurungzebe (Alamgir I, House of Timur):—

Agra.
Ajmere.
Allahábád.
Behár.
Bedr, Capital Zaffarábád.
Bengal.
Berár.
Daulatábád.
Delhi.
Guzerát.
Haidarábád.
Kábul.
Káshmir.
Multán.
Orissa.
Oude.
Scinde.
Vijapore.

Revenue . . . . £37,724,615.

N. B.—The provinces of Badákhshán, Bálkh, and Kandahar had been lost.

1707 A.D. Bahádur Sháh (House of Timur) ascends the throne.

1712 A.D. Jahándár Sháh (House of Timur) ascends the throne. Put to death by his nephew and successor. Civil War.

1713 A.D. Peter I, Emperor of all the Russias, enters into relations with the Turkumáns.

1716 A.D. Captain Bukholts builds a fort at Omsk.

Peter the Great sends Prince Bekóvitch Cherkásski with 6,000 troops, in 69 vessels, to the Caspian. Bekóvitch erects three forts; St. Peter on Cape Tup-Káraghán, Fort Alexander in the Gulf of Bekterli-Eesháu, and Fort Bekóvitch on the Krásnovodsk promontory at the entrance to Balkhán Bay.

The Tekke Turkumáns occupy the Akhál *oasis*.

1717 A.D. Prince Bekóvitch Cherkásski's fatal march to Khiva. He defeats the Khivans, but, being lured on, by offers of submission, to their capital, he allows his troops (700 in number) to be scattered, and in a general massacre they are cut to pieces and he himself is beheaded.

1718 A.D. Prince Gagarin, Governor of Tobolsk, builds a Russian fort at Semipálatinsk.

1719 A.D. Muhammad Sháh (House of Timur) ascends the throne.

1721 A.D. The Italian, Florio Beneveni, arrives at Bukhára on a mission for Peter I of Russia.

1722 A.D. Peter I of Russia despatches an embassy to Kalmitski Kantaish in order to learn the state of affairs in Djungária.

1723 A.D. Captain Bruce surveys the east shore of the Caspian Sea.

1725 A.D. Beneveni flies from Bukhára to Khiva, performing the distance in eleven days. Thence, in order to avoid being taken prisoner, he flies to the little town of Gurieff.

1730 A.D. Abdul Khair, Khán of the Lesser Kirghiz Horde, begs to be allowed to become the feudatory of Russia.

1731 A.D. The Khivans rob the Russian Colonel of Artillery, Herberg.

1732 A.D. Mirza Televkeyeff brings under the protectorate of Russia the Lesser Kirghiz Horde and those Kára-Kalpaks inhabiting the lowlands of the Sir-Daria.

1734 A.D. The Kirghiz of the Central Horde accept the protectorate of Russia. State Councillor Kirilloff is entrusted with a treaty to be signed by the Khán of the Kára-Kalpaks authorising the establishment of Russian ports and armed vessels on the Sea of Aral.

1736 A.D. Nádir Sháh proclaimed King of Persia by 15,000 nobles, and Thamas is deposed on the ground of his effeminacy.

1738 A.D. Nádir Sháh invades India with 64,500 men and 4,000 followers, *viâ* Peshávar.

Captain Elton's journey to the Caspian.

1739 A.D. Lieutenant Gladisheff and Geodesist Murávin, whose services had been sought by the Khán of the Lesser Horde for the construction of a town at the mouth of the Sir-Daria, barely escapes imprisonment and death by flight.

1739 A.D.	Nádir Sháh of Persia invades India.
	Nádir Sháh of Persia acquires the famous Koh-i-Nur diamond.
1741 A.D.	Captain Woodruffe's journey to the Caspian.
	The Russian Government invites Abul Khair, Khán of the Lesser Kirghiz Horde, to the throne of Khiva in place of Khán Yulbárs slain by Nádír Sháh of Persia.
1747 A.D.	Nádir Sháh is murdered at the age of 60, his health being previously much broken by dropsy.
1748 A.D.	Muhammad Sháh (House of Timur) dies.
	Ahmed Sháh (House of Timur) ascends the throne.
	Ahmad Khán Abdáli (Duráni) invades India at the head of 12,000 men.
1754 A.D.	Ahmed Sháh (House of Timur) is deposed and blinded.
	Alamgir II (House of Timur) ascends the throne.
1756 A.D.	Ahmad Khán Abdáli invades India for the third time from Kandahar, *viá* the Bolán.
	Rise of the British Power in India.
	Bankote acquired by the British from the Peishwa (Mahratta or Hindu).
1757 A.D.	The 24-Pergunnahs, or parishes, near Calcutta acquired by the British from the Viceroy of Bengal (Muhammadan).
1758 A.D.	Ahmad Khán Abdáli invades India for the fourth time. He advances to Shikarpur by the Bolán and thence marches up the Indus to Pesháwar.
1759 A.D.	Sháh Alam (House of Timur) ascends the throne.
	Alamgir II (House of Timur) is murdered by Ghází-Ul Din.
	Akbar Sháh (House of Timur) ascends the throne.
	Masulipatam acquired by the British from the Viceroy of the Deccan (Muhammadan).
1760 A.D.	Burdwán, Midnapur, and Chittagong acquired by the British from the Viceroy of Bengal (Muhammadan).
1761 A.D.	Abdulla, the Turkumán, invades India.
1765 A.D.	Company's Jághir acquired by the British from the Viceroy of Arcot (Muhammadan).
	Bengal and Behár acquired by the British from the King of Delhi (the Great Moghul or Chief Muhammadan power in India).
1766 A.D.	Northern Sirkárs acquired by the British from the Viceroy of the Deccan (Muhammadan).
1770 A.D.	Hait, Khán of the Lesser Kirghiz Horde, is placed by the Russian Government on the throne of Khiva.
1774 A.D.	A frontier tribunal is established in the town of Orenburg.
	Clive commits suicide in London.
1775 A.D.	Island of Salsette acquired by the British from the Mahrattas (Hindu).
	Benares acquired by the British from the Viceroy of Oude (Muhammadan).
1778 A.D.	Nagore acquired by the British from the Rájah of Tanjore (Hindu).
1781 A.D.	A Russian squadron, consisting of four frigates and two armed troops, anchors in the Bay of Ashraf.
1782 A.D.	Catherine II of Russia approves of the preparation of a frontier expedition to start from the town of Orenburg.
1784 A.D.	The Amir Maasum (Begi Ján) mounts the throne of Bukhára.
1786 A.D.	Pulo Pinang acquired by the British from the King of Ourdá.
	Guntoor Sirkár acquired by the British from the Viceroy of the Deccan (Muhammadan).
1787 A.D.	The Amir of Bukhára kills Bairum Ali Khán, Persian Governor of Merv, and occupies the city.
1789 A.D.	Evrenkoff, a Russian under-officer, penetrates to Merv.
1790 A.D.	The Russian officials, Burnasheff and Pospailoff, procure some interesting information regarding Bukhára and Táshkand.
1792 A.D.	Malabar, &c., acquired by the British from Tippoo Sultán of Mysore (Muhammadan).

1793 A.D.	Catherine II of Russia sends Doctor Blankennágen to Khiva to cure the ruler of that Khánate.
	Fall of Seringapatam.
1794 A.D.	Merv is rased to the ground, its dam is destroyed, and its inhabitants are deported to Bukhára.
1795 A.D.	Murád, Amir of Bukhára, takes the town of Merv and sends its inhabitants to Bukhára. The descendants of these prisoners teach the Bukhárans the manufacture of silk and of silken materials.
1799 A.D.	Coimbatore, &c., wrested by the British from Tippoo Sultán (Muhammadan).
	The frontier expedition is replaced by a Frontier Commission.
	Tanjore acquired by the British from the Rájah of Tanjore (Hindu).
1800 A.D.	Districts made over by Tippoo Sultán to the Viceroy of the Deccan (Muhammadan) acquired by the British.
1801 A.D.	Carnatic acquired by the British from the Viceroy of the Carnatic (Muhammadan).
	Goruckpur and Bareilly acquired by the British from the Viceroy of Oude (Muhammadan).
1802 A.D.	Districts in Bundelcund and Gujerat acquired by the British from the Peishwa, head of the Mahrattas (Hindu).
1803 A.D.	Cuttack and Balasore acquired by the British from the Rájah of Berár (Orissa) (Hindu).
1805 A.D.	Delhi, &c., acquired by the British from Scindia (Mahratta or Hindu).
	Districts in Gujerát acquired by the British from the Guicowár of Baroda (Mahratta or Hindu).
	Mahratta power broken at the battle of Assaye, gained by Wellington.
1811 A.D.	Despatch of Putuntseff to Djungária, to carry out explorations.
1812 A.D.	Bukei is appointed Khán of the Inner or Bukeyeff Horde.
1814 A.D.	Názaroff is sent on a mission to the Khánate of Khokand.
1815 A.D.	Kumáon acquired by the British from Nipál (Gurkha or Hindu).
1817 A.D.	Ahmedábád acquired by the British from the Guicowár (Mahratta or Hindu).
	Saugor, &c., acquired by the British from the Peishwa (Head of the Mahratta or Hindu).
	Beginning of Russian settlements in the Iletsk region.
1818 A.D.	Ajmere acquired by the British from Scindia (Mahratta or Hindu).
	Patna, &c., acquired by the British from the Rajah of Berár (Hindu).
	Khandeish acquired by the British from Holkar (Mahratta or Hindu).
	Poonah, Southern Mahratta Country, wrested by the British from the Peishwa (head of the Mahratta or Hindu).
1819 A.D.	Captain Murávieff (afterwards the conqueror of Kárs) traverses the Turkumán desert, *en route* to Khiva.
	Captain Murávieff and Major Ponomáreff, who were sent to Khiva by General Yermoloff, barely escape being killed there.
1820 A.D.	Lands in Southern Konkan acquired by the British from the Rájá of Sáwunt Wari (Hindu).
	Russian and European literature is enriched by the splendid books on Bukhára and Khiva of Murávieff, Meyendorff, and Yeversmann.
1821-22 A.D.	Mr. James Bailie Fraser's travels in Khurássán.
1822 A.D.	Districts of Beejapore acquired by the British from the Viceroy of the Deccan (Muhammadan).
	Russian Embassy sent to Bukhára under Negri. Legislation for the Siberian Kirghiz.
1824 A.D.	Singapore acquired by the British from the Rájah of Johore (Hindu).
	Cossack colonies appeared on those parts of the Kirghiz steppe adjacent to the Irtish.
1825 A.D.	Malacca acquired by the British from the Dutch.

	Colonel (afterwards Field Marshal) Berg lands at Mangishlák but fails to reach Khiva.
	A caravan of Russian goods, escorted by 625 men and 2 guns, is attacked and plundered at the crossing over the Yáni-Darya. Colonel Berg is ordered to compile a topographical description of the steppes between the line of the Ural and the Aral Sea and Khiva.
1826 A. D.	Assam and Arrakan acquired by the British from the King of Ava (Burmese).
	The Frontier Commission has placed at its disposal the sum of 21,209 *roubles* (about £2,130) for the purpose of ransoming any Russian prisoners who might be exposed for sale in the markets of Khiva, there being taken of such men yearly, on and around the Caspian Sea, 200 men.
1828 A. D.	Russia becomes sole mistress of the Caspian by the Treaty of Turkomántchai.
1829 A. D.	Lieutenant Arthur Conolly's Overland journey to India.
1830 A. D.	Ten thousand Tekke families migrate from Akhál to the Tajand under Oraz Khán.
1831 A.D.	The Missionary, Reverend Joseph Wolff, D.D., visits Merv.
1832 A.D.	The Khivans conquer Merv. Alexander Burnes arrives at Merv.
1833 A.D.	The Persians wrest Sarakhs from the Sálor-Turkumáns.
1834 A.D.	Coorg acquired by the British from the Rájah of Coorg (Hindu).
	Count Perovski builds Fort Novo-Alexandrovsk on the east coast of the Caspian sea.
	The Tekkes occupy Merv.
1835 A.D.	Jynteeah acquired by the British from the Rájah of Jynteeah (Hindu).
1836 A.D.	Ferozepore lapsed territory (Sikh-Hindu) acquired by the British.
	Ludhiána lapsed territory (Sikh-Hindu) acquired by the British.
	The Khivans seize the Inspector of the Emba waters and the commander of a gunboat (4 guns) and all her crew, together with the guns and ship's boats. The Bukháran Envoy to St. Petersburg declares the friendship of the Amir towards Russia and his wish to strengthen the trade and political relations with Merv.
1837 A.D.	An English army marches against Kábul.
	Baron Bode's travels on the east coast of the Caspian.
	Insurrection on the Orenburg steppe of the Kirghiz Sultán and his *Bátirs* (braves) Isetai and Julaman.
	An embassy under Lieutenant Vitkevitch leaves Orenburg for Kábul.
1838 A.D.	Runjeet Singh dies at Lahore.
	Part of the protected Sikh states (Hindu), lapsed territory, acquired by the British.
	Ghazni falls.
	Sultán Kásim and his son Kenisár raise the steppe country in revolt.
	Establishment of Russian cruisers on the Caspian Sea.
1839 A.D.	English invasion of Kábul.
	The English occupy Afghánistán.
	The setting out of Count Perovski's Khivan expedition is sanctioned by Imperial Command. 1,700,000 *roubles* (about £212,500) and 12,000 ducats are allotted for the expedition which consists of 5,217 of all ranks, with 22 guns and 4 rocket-stands.
	Count Perovski builds Forts Emba and Ak-Bulák.
	Perovski sets out from Orenburg against Khiva, with 5,000 troops and 10,000 camels. By the time he reaches Ak-Bulák, 300 miles from Khiva, only 2,000 camels remain alive, and he therefore has to retreat.
1840 A.D.	Jaloun, lapsed territory (Shikh-Hindu), acquired by the British.
	Major Abbott passes through Merv *en route* to Khiva from Herát.

Richmond Shakespeare takes the same route.

Flores Naselli visits Trans-Caspia.

Return of Count Perovski's force from Chushka-kul to Orenburg (on the $\frac{8\text{th}}{20\text{th}}$ July) after an eight months' march across the steppe. During the expedition he lost by death 1,054 of all ranks, whilst 609 others were sent into hospital at Orenburg.

Arrival at Orenburg of Envoys from Khiva with 418 Russian prisoners.

Issue of the Khivan Khán's *firmán* forbidding not only the taking of Russian prisoners but all traffic in them.

Buteneff's mission to Bukhára.

1841 A. D. Kurnál acquired by the British from the Rájah of Kurnál (Hindu).

Public beheadal at Bukhára of the Englishmen Stoddart and Conolly. Mutilation of Abbot and Shakespeare at Khiva $\frac{5\text{th}}{17\text{th}}$ August. Departure of Colonel Blaramberg's mission to Bukhára. Captain Nikiforoff's mission to Khiva.

Russia occupies Ashuráda.

1842 A.D. Lieutenant-Colonel Danilevski concludes a treaty with the Khivans.

The Scientific Geologists Khánikoff, Leman, and Buteneff send from Sámarkand valuable information relating to the Khánate of Bukhára.

Kábul massacre wherein a British army of 4,000 fighting men and 12,000 camp-followers were cut to pieces.

The British army invading Afghánistán ceased to exist at Jagdalak.

Dost Muhammad returns to Kábul, and is restored by the Afgháns to the throne.

1843 A.D. Khythúl, lapsed territory (Hindu), acquired by the British.

Kolába, lapsed territory, acquired by the British.

Scinde wrested by the British from the Amirs of Scinde (Muhammadan).

Medemi Khán, of Khiva, while encamped at Merv, is killed by Turkumán horsemen who had penetrated to the camp.

Mr. Taylour Thomson passes through Merv on his way to Khiva.

1844 A.D. Wolff (Rev. J.) passes through Merv on his way from Meshed to Bukhára, to ascertain the fate of Stoddart and Conolly.

Lieutenant-Colonel Lebedeff pacifies the Kirghiz steppe which had been raised in revolt by Kenisár Kasimoff.

1845 A.D. Serampore acquired by the British from the Danes.

Erection of Fort Orenburg on the Turgai and of Fort Ural on the Irgiz.

Ferrier's travels in Khurássán.

1846 A.D. Jallandhur Doáb acquired by the British from Dhalip Singh (Sikh or Hindu).

The Greater Horde accepts a Russian protectorate.

1847 A.D. Part of protected Sikh states (Hindu) annexed by the British.

Erection of Fort Raim (Aral) on the Sir-Daria.

Opening of Russian navigation on the Sea of Aral. The two first ships are called the *Nicholas* and the ***Michael.***

Building of Fort Kopál.

Occupation by the Russians of the whole of the Trans-Ili tract.

Building of Forts Vairnoye (Almáta) and Kastek.

1848 A.D. Satára, lapsed territory (Hindu), acquired by the British.

The English acquire the famous Koh-i-Nur diamond, regarding which the natives have the superstition that the owner of it is unfortunate.

Lieutenant Butakoff publishes a complete sketch and description of the Sea of Aral. Building of Fort Kos-Aral and Kára-Butak.

	Baron Bode's second visit to Trans-Caspia.
1849 A.D.	Panjáb (Sikh or Hindu) annexed by the British.
	Jutpoor, lapsed territory, acquired by the British.
	Emigration of 25 families of Ural Cossacks to Fort Raim, of 21 to Orenburg, of 13 to Urálsk, and of 4 to Fort Kára-Butak.
1850 A.D.	Sumbulpur, lapsed territory, acquired by the British.
1851 A.D.	The treaty of Kulja permits of Russian trade with Western China *viâ* Kulja and Chuguchák.
1852 A.D.	The bringing to Fort Aral of 10,000 *puds* (166$\frac{2}{3}$ tons) of block anthracite priced at 1$\frac{1}{5}$ *roubles* (3*s.* 5*d.* per *pud* (36 lbs.)
	Attempt on the part of Colonel Blaramberg to gain possession of Ak Mechet (Ak-Masjid).
1853 A.D.	Count Perovski's expedition to Ak Mechet.
	Capture of Ak Mechet by storm on the $\frac{\text{28th July.}}{\text{9th August.}}$
	Building of Fort Perovski (Ak Mechet).
	Count Perovski's detachment consists of 2,170 men with 12 guns and has attached to it 9,500 camels.
	The conqueror gains possession of the entire Khivan camp with 4 *bunchuks* (Turkish standards), 7 ordinary standards, 17 guns and 130 *puds* (2$\frac{1}{6}$ tons) of powder.
1854 A.D.	Abolition of Fort Kos-Aral. Formation of the Province of Semipálatinsk.
1855 A.D.	Removal of the garrison of Fort Raim (Aral) to Fort No. 1, (Kázalinsk).
	The Kára-Kirghiz accept the protectorate of Russia.
1856 A.D.	Oude (Muhammadan) annexed by the British.
	Abdullah, Khán of Khiva, is killed in an attack on the Yámut Turkumáns. Said Muhammad, the present ruler, ascends the throne.
1857 A.D.	Bahádur Sháh (House of Timur). Mutiny of 1857 saw the end of this dynasty.
1858 A.D.	Opening of postal communication between Forts Ural and Orsk.
	Colonel Ignátieff's embassy to Khiva.
1860 A.D.	Capture of the Khokand fortresses, Tokmak on the $\frac{\text{26th August}}{\text{7th Sept.}}$ and Pishpek on the $\frac{\text{4th}}{\text{16th}}$ September.
	Occupation of the Trans-Chutract by Colonel Zimmermánn. Total defeat of 20,000 Khokandians by Lieutenant-Colonel Kolpakovsvi at Uzun-Agátch on the $\frac{\text{22nd October}}{\text{3rd November}}$. Construction of a port at Kázalinsk for the ships of the Aral Flotilla.
1861 A.D.	Defeat of 20,000 Persians sent to occupy Merv and capture of the entire army by the Tekkes.
	Occupation by the Russians of the Khokand fort of Yáni-Kurgán. Bezak, Governor-General of Orenburgh, builds Fort Julek.
1862 A.D.	Beginning of the Dungán insurrection at Urumtchi.
	Establishment of the Emba port. Capture of Fort Merke on the $\frac{\text{17th}}{\text{29th}}$ April. Fort Pishpek captured for the second time on the $\frac{\text{10th}}{\text{22nd}}$ November.
1863 A.D.	Arminius Vámbéry sets out from Teherán to explore Central Asia. Arrives at Kumish-Tapa and Khiva, following the course of the Atrak en route.
	Capture of the Khokand fort of Din-Kurgán on the $\frac{\text{30th March}}{\text{11th April}}$.
1864 A.D.	Famous three days' fight, at the village of Ikán, on the $\frac{\text{4th}}{\text{16th}}$ Dec. between a *sotnia* of Ural Cossacks under the command of *Yesaul*

(Captain) Sairoff with 10,000 Khokand brigands led by Alam Kul. Capture of Fort Aulie-Ata by General Tchernaiyeff on the $\frac{\text{5th}}{\text{17th}}$ June.

Capture of the town of Turkistán on the $\frac{\text{11th}}{\text{23rd}}$ June by General Verevkin.

Capture of the town of Chimkand on the $\frac{\text{22nd September}}{\text{4th October}}$.

Establishment of the Novo-Khokandian line.

Occupation of Fort Chináz.

1865 A.D. Capture of Fort Niáz Bek on the $\frac{\text{29th April}}{\text{11th May}}$.

Capture of the town of Táshkand by General Tchernaiyeff on the night of the $\frac{\text{14th and 15th}}{\text{26th and 27th}}$ June. The Russian force consisted of 1,951 of all ranks and 12 guns. The trophies taken were 16 standards, 63 guns, 2,000 *puds* (33$\frac{1}{3}$rd tons) of powder, and 10,000 rounds of ammunition, &c. The Russian loss was—subaltern officers, wounded 3; contused 4; rank and file, killed 25, wounded 86, contused 24. The enemy's force consisted of 5,000 *Sarbázis* and 10,000 *Sipáhis;* the whole strength of the defenders amounting to 30,000 men.

NOTE.—At the storming of Táshkand, the first within the walls of the fort were Under-Officer Khmaileff, Captain of Horse Wolfert, and *Yunker* (Cadet) Zavadovski. On the same occasion the following especially distinguished themselves for bravery, valour and zeal:—Lieutenant-Colonel Krayevski, Second Captain Abramoff, Lieutenants Makároff and Griáznoff; Cossack Squadron leader Ivánoff, Sub-Lieutenants Lapin (2nd) and Shorókhoff, Ensign Merkuloff, Doctor Matsievski and Priest Máloff.

Establishment of a new State system of Administration in Turkistán.

Formation of the Turkistán Province.

Russian embassy to Bukhára.

Opening of postal communication between Vairnoye and Táshkand.

1866 A.D. Defeat of the Amir of Bukhára's army, 40,000 strong, by General Romanvóski at Irjár on the $\frac{\text{8th}}{\text{20th}}$ May.

Capture of the town of Khojand on the $\frac{\text{24th May}}{\text{5th June}}$.

Capture of the town of Ura-Tapa on the $\frac{\text{2nd}}{\text{14th}}$ October.

Capture of Fort Jizák on the $\frac{\text{18th}}{\text{30th}}$ October.

Opening of postal communication between Táshkand and Ura-Tapa.

1867 A.D. Capture of Fort Yáni-Kurgán on the $\frac{\text{27th May}}{\text{8th June}}$.

Including of the Semiraitchensk and Sir-Daria provinces in the Turkistán Governor Generalship and Military Circle.

Arrival at Táshkand on the $\frac{\text{7th}}{\text{19th}}$ November of the first Governor General of Turkistán, General Aide-de-Camp Constantine Petróvitch Von Kaufmann, 1st.

Proposals of peace sent to the Ameer of Bukhára.

Establishment of the Turkistán Circle of Administration, and of all its outlying districts.

Foundations laid of the European quarter of the town of Táshkand.

Táshkand Public Library set on foot.

Opening at Khojand by Mons. M. A. Khludoff of the first silk-spinning factory on the European system.

1868 A. D. Earthquake at Táshkand on the $\frac{18\text{th}}{30\text{th}}$ March wherein 15,000 natives perished under the ruins of their huts.

Fight on the $\frac{1\text{st}}{13\text{th}}$ May at Chupán-Ata, under the personal command of General Aide-de-Camp Von Kaufmánn, 1st, which led to the fall of Sámarkand on the $\frac{2\text{nd}}{14\text{th}}$ idem.

The Russian trophies were 21 guns and the enemy's camp. The Russian loss amounted to—wounded, subaltern officers 3; rank and file 28; contused, 1 doctor, 6 rank and file; 2 rank and file killed.

Occupation of the town of Urgut on the $\frac{12\text{th}}{24\text{th}}$ May.

Affair at Kára-Tapa on the $\frac{27\text{th May}}{8\text{th June}}$.

Defeat of the Bukháran forces on the Zira-Bulák heights $\frac{2\text{nd}}{14\text{th}}$ June.

Relief on the $\frac{8\text{th}}{20\text{th}}$ June of the Russian beseiged garrison at Sámarkand by a Russian force from Shahr-i-Sabz.

General Aide-de-Camp Von Kaufmánn, 1st, exacts from the Amir of Bukhára a war indemnity of 500,000 *roubles* (£62,500) prior to concluding with him a treaty of peace.

Construction of a road from the southern part of Semiraitchia towards Káshgár *viâ* the Buám Gorge.

Raising of 40,000 *puds* (666⅔rds tons) of coal from the Tatarinoff coal mines, for the ships of the Aral flotilla.

Division of the Kirghiz Steppe into four provinces, Urál, Turgai, in the Governor Generalship of Orenburg, and Akmolinsk and Semipálatinsk in the Governor Generalship of Western Siberia, the provincial towns being Uralsk, Fort Orenburg, Akmolinsk and Semipálatinsk.

Abolition of the Western Siberian-*cum*-Orenburg Customs Line.

Prohibition against the import of Anglo-Indian manufactured goods.

Tax put upon Indian tea.

Abolition of the tax on Kiákhta tea in transit through Turkistán territory.

1867 A. D. Opening of a postal (carriage) service between Táshkand and Sámarkand *viâ* Chináz and Jizák.

Breaking up of Babán's robber bands which pillaged the eastern portion of the Khánate of Bukhára.

Beginning of Russian settlements in Turkistán, from Siberia towards Aulie-Ata.

Opening of postal arrangements throughout Turkistán.

Kirghiz insurrection on the Orenburg Steppe.

Freeing Turkistán from the State dues on tobacco.

Introduction of a tax on land into the Sir-Daria and Semiraitchensk provinces.

Completion of the organisation of the Turkistán Administration.

Pervushin opens a silk-winding factory at Táshkand and Raevski, one at Sámarkand.

Issue to the Russian troops of chamois-leather trowsers (*sharovárs*) shirts of the "gymnasium" and "sapper" pattern and linen blouses.

1869 A. D. General Radetski and Colonel Stolaityeff occupy Krásnovodsk.

1870 A. D. Capture of the Kuli-Kalán heights by General Abramoff on the $\frac{14\text{th}}{26\text{th}}$ August.

Restoration to the Amir of Bukhára of the Provinces of Shahr-i-Sabz, Kitáb and Sháar which had thrown off their allegiance to him.

First issue to the Russian troops of cotton web *Máta* (Nos. 1—6) for their under-clothing.

Opening of a market at Táshkand and erection of a market-place.

Opening of a public library at Táshkand.

First issue of the *Turkistán Gazette.*

Insurrection of the Mangishlák Kirghiz. Fort Alexander is besieged. Colonel Rukin, to avoid capture, shoots himself. The Russian garrison is ultimately relieved.

Micháilovok and Mulla-Kára are occupied by the Russians who erect forts at these places.

1871 A.D. Affairs at Ketmen, Alimta, and Chin-Cha-Hodzi.

Surrender of Kulja, and voluntary submission of Sultán Abil-Ogliá on the $\frac{\text{21st June}}{\text{3rd July}}$.

First issue to the Russian troops in Turkistán of a tea ration instead of spirit.

Exaction from the Kulján Khánate of a war indemnity of 65,000 *roubles* (£8,125).

Institution of a Bishopric of Turkistán and Táshkand.

Starting of a school of sericulture of Táshkand.

The management of the postal service in the Semiraitchensk and Sir-Daria provinces is taken out of the hands of the Provincial authorities and made over to the direct control of the Postal Department.

Russian expenditure on account of the Kulján expedition amounted to 64,602 *roubles* (£8,075-5-0); that on account of the Khivan preparations to 83,667$\frac{2}{5}$ (£10,458-8-6).

Publication of Mons. Ibrahimoff's calendar in the Sárt dialect: this calendar is the *first book* published at Táshkand. The issue of of it during the first two days amounted to 500 copies.

1871 A.D. The Turkumáns attack Micháilovsk; the Russians, in retaliation, cross the desert to Kizil-Arvat which they destroy.

Colonel Markózoff occupies Tchikishlár. The Turkumáns divert the Atrak at Band.

1872 A.D. Colonel Stolaityeff marches from Krásnovodsk to Kizil-Arvát, and Colonel Markózoff from Tchikishlár to Khwája-Kala. The latter reaches Burma, and then retreats to Kizil-Arvát and to Igdi, where, being attacked by the Turkumáns, and losing his camels, he retires down the Atrak, constructing on his way an earthwork at Báyat-Háji, 4 marches from Tchikishlár.

Captain Marsh travels through Khurássán to Herát. See "A ride through Islám."

Colonel Stebnitski visits Trans-Caspia.

Construction of a road through the Duván-Arik Gorge to Fort Nárin.

Exploration of the Kuljan tract.

1873 A. D. The Khivan campaign. Fights at Utch-Utchák, Sheikh-Arik and Chándir.

Subjugation of the Khánate of Khiva by General-Aide-de-Camp[1] Von Kaufmánn, 1st, on the $\frac{\text{29th May}}{\text{10th June}}$.

Abolition of the slave trade throughout the Khivan dominions.

Freeing of 40,000 Persian slaves.

Founding of Forts Peter-Alexander and Nukus.

Remission of 50 per cent. of the dues levied from the population of the Zarafshán Circle as compared with those in force during the Bukháran rule.

Construction of a telegraph line from Western Siberia.

---

[1] This Russian rank of *General-Adjutant* is frequently rendered into English by the words "General Adjutant". In this an error is involved, because the rank in question signifies that the bearer is an *Aide-de-Camp* to the Emperor, *and is consequently* a General Officer.—W. E. G.

Invasion of Khiva by the Russians. Two columns leave the Caspian, of which Markózoff's, after reaching Igdi, collapses, and has to retreat disastrously to Krásnovodsk. The other column, under Lomákin, which started from Fort Alexandrovsk, was, successful. Khiva falls, and after this event Kaufmánn conducts his campaign in the "Circassian style" against the Yámut-Turkumáns.

Formation of Russian territory beyond the Caspian into the "Trans-Caspian Military District" with seat of administration at Krásnovodsk.

General Lomákin is appointed Governor of the new Province.

Colonel Valentine Baker explores the Atrak region. See "Clouds in the East." Peace with Khiva.

1874 A.D. Establishment of the Orsk-Táshkand postal service.

Steamboat communication between Kázalinsk and Nukus.

Voyage of the steamer *Sámarkand* to Chahárjui.

Opening of the Táshkand City Dispensary at the cost of the natives, and issue *gratis* of medicines, &c., therefrom.

Captain Napier explores Khurássán and the edge of the Turkumán region.

Colonel Tillo explores the country between the Aral sea and the *Mërtvi Kultuk* (the dead creek) bay on the Caspian.

Colonel Ivánoff, Commander of Fort Peter-Alexander in the Khivan *oasis*, ravages the territory of the Yámut-Turkumáns, and consolidates Russia's power on the Oxus.

1875 A.D. Opening of a State Bank at Táshkand.

Khudóyar Khán is expelled by the Khokandians.

Raid of Khokandians, who declared a *jahád*, on the Khojand and Kuráma districts.

Battle of Makhrám on the $\frac{\text{22nd Aug.}}{\text{3rd Sept.}}$

Occupation by the Russians of the towns of Khokand, Margilán, and Osh.

Formation of the Námangán Section.

Fight with the Kipcháks and Kára-Kirghiz.

Pulat Beg, the Pretender, proclaims himself Khán of Khokand.

Affair before Turya-Kurghán on the $\frac{\text{23rd Oct.}}{\text{4th Sept.}}$

Defeat of a Kipchák inroad on the town of Námangán on the $\frac{\text{24th, 25th and 26th October}}{\text{5th, 6th and 7th November}}$.

Opening of State schools in Turkistán on the $\frac{\text{29th May}}{\text{10th June}}$.

Affair before Balikcha on the $\frac{\text{12th}}{\text{24th}}$ November.

Total cost of the Khokand Expedition estimated to be 29,970½ *roubles* (£3,746-6-3).

Colonel Ivánoff repeats his raids into Yámut territory, and completely destroys their power.

Sufi Khán, Chief of Kizil-Arvát, visits Lomákin at Krásnovodsk. Lomákin makes a reconnaissance as far as Sári-Kámish, and thence south to Tchikishlár.

Colonel C. M. MacGregor explores Khurássán.

1875-76 A.D. Captain Burnaby's ride to Khiva.

1876 A.D. Abolition of *commercial* taxes in Turkistán.

Opening of a preparatory school for boys, and a school for girls at Táshkand and Vairnoye.

Second storming of the town of Andiján on the $\frac{\text{8th}}{\text{20th}}$ January.

Affair before Assake on the $\frac{\text{18th}}{\text{30th}}$ January.

Affair before Utch-Kurgán on the $\frac{\text{28th January}}{\text{9th February}}$.

Formation of the Province of Farghána out of the former Khánate of Khokand on the $\frac{\text{3rd}}{\text{15th}}$ February.

Occupation of the town of Khokand by General Skobeleff on the $\frac{\text{8th}}{\text{20th}}$ February.

Founding of the Pervo-Nachálni settlement (by Ural settlers) 19 *versts* (12 miles) from Fort Peter-Alexander.

Institution of a Committee of Inquiry into the administration of the scholastic establishments of Turkistán.

The Tekkes attack those Turkumáns near Krásnovodsk who are friendly to the Russians.

Defeat of a detachment sent by Lomákin to Kizil-Arvat.

Captain Butler visits Khurássán.

1877 A.D. Opening of a military club at Tashkand.

Opening of the first private lithographic press at Táshkand by Messrs. Lakhtin and Pastúkhoff.

Establishment of a Municipality for the town of Táshkand.

Institution of the Office of Inspector of Native Seminaries.

Death of Archbishop Sofónia, first Metropolitan of Turkistán and Táshkand.

5,000 emigrants from Káshgária, including Sárts, Kirghiz, and Dungáns enter Russian territory at Issik-Kul and Tokmák.

General Lomákin, whilst advancing upon Kizil-Arvat, is met, and again defeated, by the Tekkes.

Death of Kaushid Khán of Merv who is succeeded by his son Bába Khán, according to English accounts, but by Nur Verdi Khán, according to Russian and more trustworthy statements.

1878 A.D. Earthquake at Táshkand on the $\frac{\text{18th February}}{\text{2nd March}}$ at 11-12 A.M., lasting several seconds.

On the $\frac{\text{21st February}}{\text{5th March}}$ at 8-30 A. M. there was a second earthquake.

Alexander is appointed Bishop of Turkistán and Táshkand.

The Kirghiz of the Kázalinsk District subscribe 10,000 *roubles*, (£1,250) to the Russian Red Cross Society.

The Perovski Kirghiz and the inhabitants of the Aulie-Ata District also subscribe 10,000 *roubles* (£1,250) for the same object.

The subscriptions of the Chimkand Kirghiz amount to 4,810 (£601-5-0).

A second Inspector of Native Seminaries is appointed.

Opening at Khokand, Margilán, Osh, and Námangán of city schools for boys and for girls who may have reached the second class.

Alexander, Bishop of Turkistán and Táshkand, arrives at Táshkand.

A Russian expeditionary force marches towards Jám (on the Bukháran frontier).[1]

Opening of an Agricultural Exhibition at Táshkand on the $\frac{\text{4th}}{\text{16th}}$ June.

Russian Mission under General Stolaityeff proceeds to Kábul.

Arrival at Táshkand of Envoys from the Amir of Afghánistán.

Russian Mission to Bukhára headed by Actual State Councillor P. P. Kablukoff, Chamberlain of the Court of H. I. Majesty.

Arrival at Táshkand of Envoys from Bukhára.

From the $\frac{\text{1st}}{\text{13th}}$ January 1879 the existing District Treasuries throughout Turkistán are renamed District Banks.

[1] There to await the result of the Conference of Berlin. W. E. G.

Formation of a State Agricultural Department in the Province of Farghána.

Transfer of the Táshkand City Dispensary to the City Municipality.

Consequent on the abolition of *gratis* issues of medicines to Natives, the profits of the dispensary amount to 10,000 *roubles* (£1,250) in one year.

Captains Butler and Napier visit Khurássán.

Colonel Grodekoff rides from Sámarkand to Herát, and afterwards through Khurássán to the Caspian.

Lomákin, having reached Khwája-Kala, in the course of his great campaign against the Tekkes, is compelled to make a disastrous retreat to the Caspian.

1879 A.D. Arrival at Táshkand on the $\frac{9\text{th}}{21\text{st}}$ February of an embassy from Shere Ali, Amír of Afghánistán, consisting of four persons : *viz.*, the first cousin of the Amir, the Minister for Foreign Affairs, the *Kázi*, and one of the officers of the Amír's Court.

With the above embassy there returned from Afghánistán the Russian Mission that was sent to Kábul during the previous year.

Captain Napier visits Trans-Caspia.

Mr. O'Donovan visits Trans-Caspia.

Second great campaign against the Tekkes conducted by Lázareff and Lomákin.

Lázareff arrives at Tchikishlár and visits Tchát and Krásnovodsk and then returns to Tiflis.

April 19th.—Action beyond Burnák between Russians and Tekkes, the former are repulsed with the loss of 500 camels.

Extensive war preparations on the part of Russia.

June 3rd.—Return of Lázareff to Tchikishlár.

June 19th.—Departure of the Russian advance guard.

Delays at Tchikishlár.

August 11th.—Russian main body begins its march.

August 26th.—Death of Lázareff at Tchát, and assumption of command by Lomákin.

August 31st.—Russian Council of War at Khwája-Kala and decision to invade Akhál.

The Russians enter Akhál by the Band-Hasan (Bendesen) pass of the Kopet-Tágh range.

September 9th.—Battle of Dangil-Tapa. Repulse of the Russians with 450 killed and wounded.

September 10th.—The Russians retreat from Dangil-Tapa.

September 19th.—The Russian Army in its retreat reaches Band-Hassan (Bendesen).

October 5th.—General Tergukásoff reaches Társakan and assumes command of the Russian expeditionary force.

October 31st.—The remains of the Russian force reaches Tchikishlár.

November-December.—The Russians withdraw their shattered forces to the Caucasus.

1880 A.D. January 7th. Capture of a Russian convoy by Tekkes near Tchát.

January 30th.—Tergukásoff resigns the command of the Trans-Caspia army and is succeeded by Major-General Murávieff (of Kars celebrity).

February 27th.—Engagement between the Russians and some Tekkes under Tekme-Sardár near Duz-Olum, where 25 Tekkes are killed.

Reported execution of Sufi-Khán by the Tekkes of Kizil-Arvát.

March 31st.—General Lomákin is relieved of the Civil Governorship of the Trans-Caspian region, and is succeeded by General Petrúsevitch (killed during Skobeleff's storming of Dangil-Tapa).

April 12th.—Departure of General Skobeleff from St. Petersburg for Tiflis.

April 25th.—Arrival of General Skobeleff at Tiflis.
April 26th.—General Skobeleff is gazetted Commander-in-Chief o the "Russian Army of Operation across the Caspian."
May 25th.—General Skobeleff arrives at Tchikishlár.
Attack of Tekkes on Kuchán reported.
June 2nd.—Advance of Skobeleff from Tchikishlár with 2,500 Infantry, Cavalry and Artillery, exclusive of reserves.
June 23rd.—Occupation of Bámi in the Akhál *oasis* and construction of a Russian fort at that place.
Russian force at Bámi reported to consist of 9 companies, 9 squadrons and 12 guns.
June 28th.—Successful reconnaissance of Burma and Artchmán by Skobeleff.
July 3rd.—Doctor Studitski killed by the Tekkes in the Band-Hasan (Bendesen) pass, where 12 Cossacks defended him for 8 hours against 300 Tekkes.
July 13th.—Skobeleff advances against Gok-Tapa with 2 companies, 3 *sotnias*, 4 horse, and 2 mountain guns, 4 mitrailleuses, and 8 rockets.
July 17th.—Unsuccessful bombardment of Gok-Tapa, from which the Russians, having expended all their ammnuition, have to retreat.
July 22nd.—The Russians fall back upon Bámi, followed by the Tekkes.
Commencement of the Micháilovsk-Kizil-Arvát Railway.
Reconnaissance of the country between Tchát and Askábad, to the south of the Kopet-Tágh range.
Great war preparations at Krásnovodsk under the control of General Petrusevitch.
The Tekkes attack Khwája-Kala and Band-Hasan (Bendesen) and carry off many stores.
Completion of 20 miles of railway to Mulla-Kára.
Electric lighting apparatus sent to Krásnovodsk to be used during the debarkation of the Russian troops.
Force under Skobeleff's command, 8 battalions, 3 squadrons, and 3 batteries.
Visit of Colonel Grodekoff to the Perso-Turkumán frontier.
Skobeleff advances against Gok-Tapa.
December 15th.—Sámursk occupied by the Russians.
December 24th.—Kuropátkin arrives at Gok-Tapa *viá* Khiva and the Igdi wells from Sámarkand.
1881 A.D. January 1st.—Yangi-Kala stormed.
January 4th.—Siege of Gok-Tapa commenced.
January 24th.—Gok-Tapa captured.
January 30th.—Askábád occupied by the Russians.
February 9th.—The *Standard* publishes Russian correspondence found by General Roberts in Kábul.

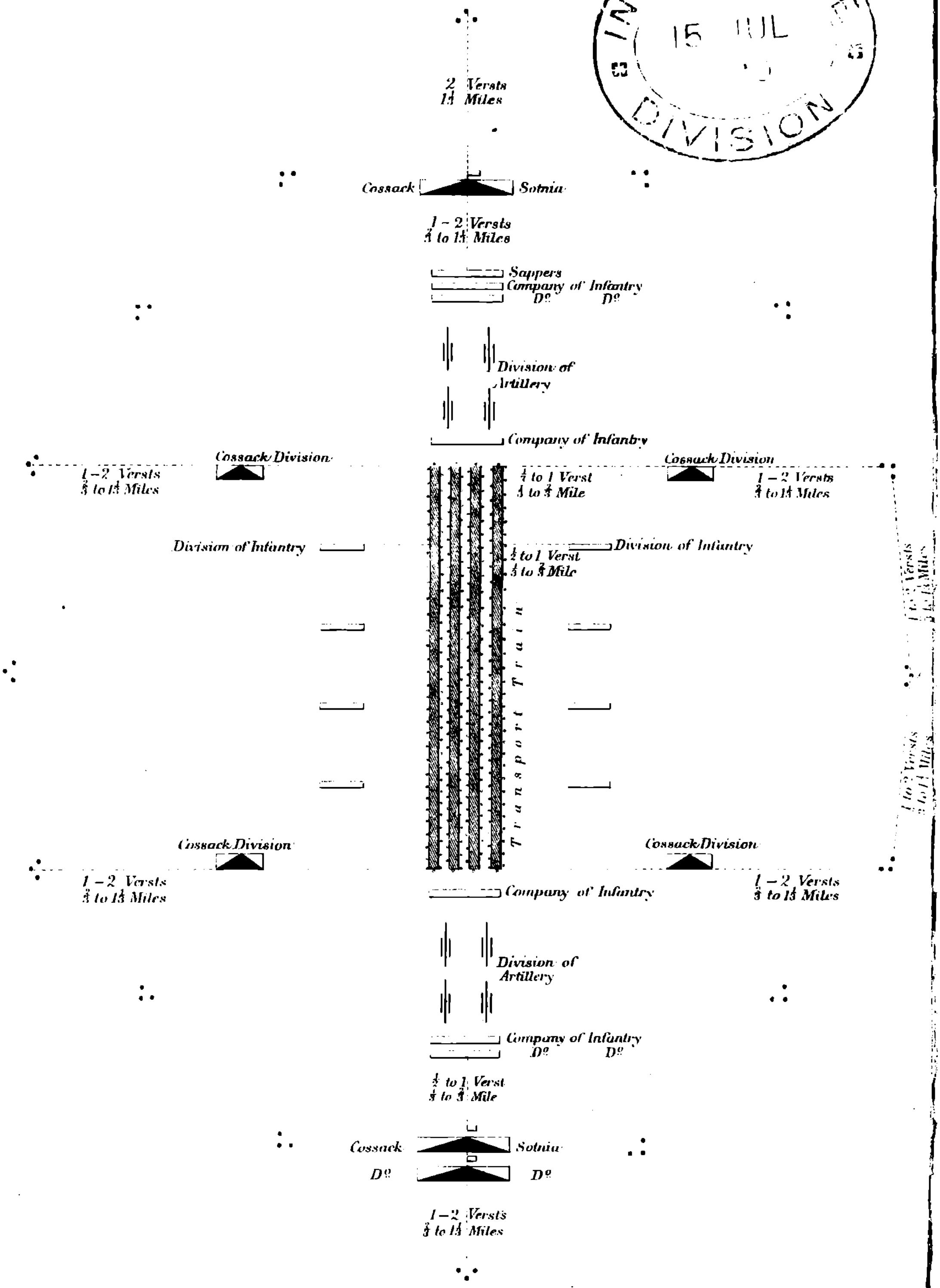
THE END.

Government of India Central Printing Office.—No. 12 Q. M. G.—-1-84.—251.

Fig. 1.

SKETCH OF THE NORMAL ORDER OF MARCH OF RUSSIAN TROOPS IN CENTRAL ASIAN CAMPAIGNS

INTELLIGENCE DIVISION 15 JUL

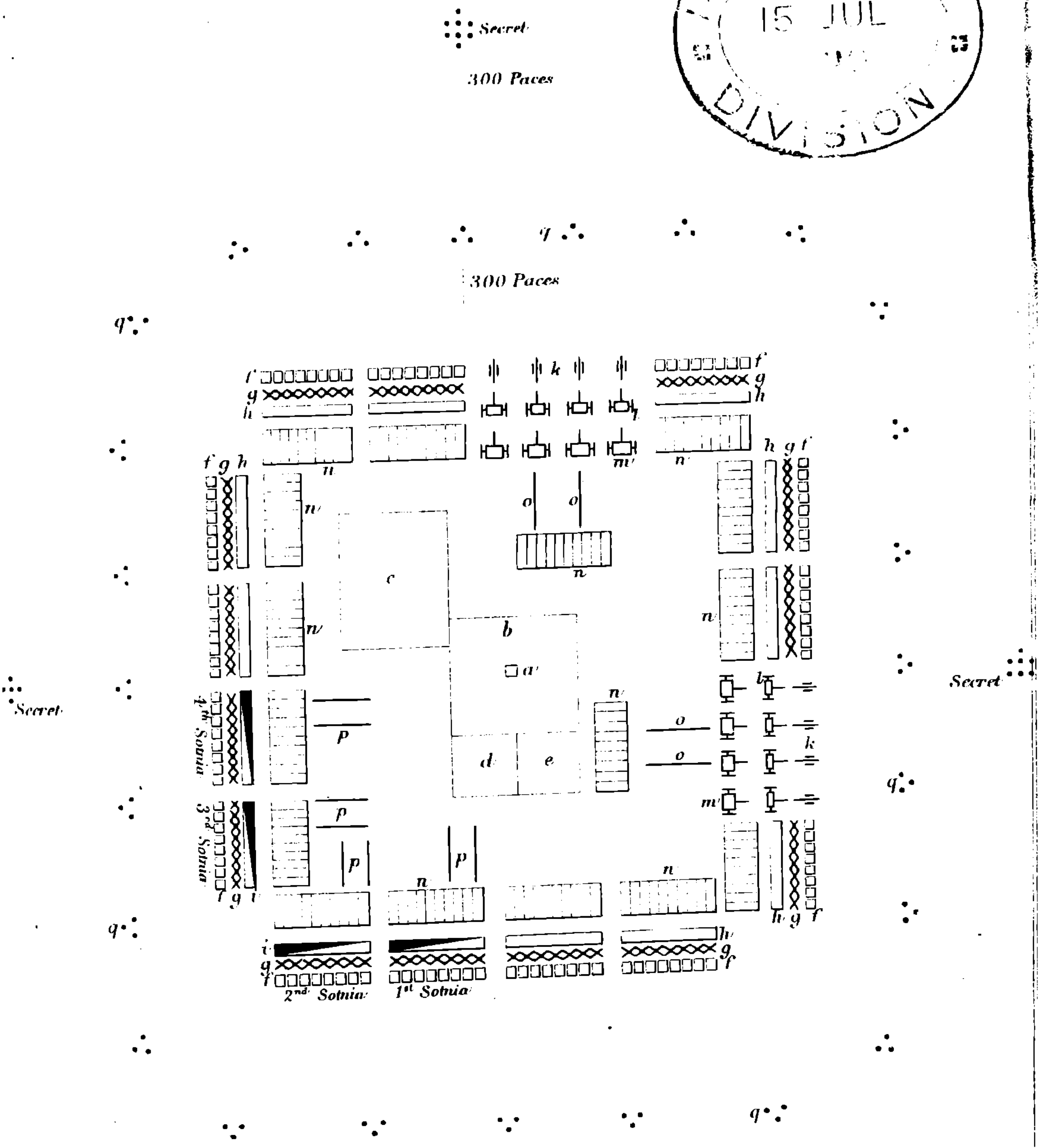


Lithographed at the Survey of India Offices, Calcutta, March 1884.

Fig. 2.

SKETCH OF THE NORMAL DISPOSITION OF RUSSIAN TROOPS IN BIVOUAC IN CENTRAL ASIAN CAMPAIGNS.

INTELLIGENCE DIVISION
15 JUL



- *a.* Detachment Commissioner.
- *b.* „ Staff.
- *c.* Hospital.
- *d.* Artillery Park.
- *e.* Engineer Park.
- *f.* Camel Packs.
- *g.* Piled Arms.
- *h.* Companies in open order.

Secret. ⁘

- *i.* Cossacks.
- *k.* Guns.
- *l.* Limbers.
- *m.* Ammunition Waggons.
- *n.* Camels.
- *o.* Artillery Horse-lines.
- *p.* Cossack Horse-lines.
- *q.* Pickets.

Lithographed at the Survey of India Offices, Calcutta, March 1884.